

# Review and guide to the isopods (Crustacea, Isopoda) of littoral and sublittoral marine habitats in the Southern California Bight

Timothy D. Stebbins<sup>1,2</sup>, Regina Wetzer<sup>1</sup>

**1** Research and Collections Branch, Natural History Museum of Los Angeles County, 900 Exposition Boulevard, Los Angeles, California 90007, USA **2** City of San Diego Marine Biology Laboratory (retired), Public Utilities Department, San Diego, California 92101, USA

Corresponding author: Timothy D. Stebbins (tdstebs@gmail.com)

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## Abstract

The isopod crustaceans reported from or expected to occur in littoral and sublittoral marine habitats of the Southern California Bight (SCB) in the northeastern Pacific Ocean are reviewed. A total of 190 species, representing 105 genera in 42 families and six suborders are covered. Approximately 84% of these isopods represent described species with the remaining 16% comprising well-documented “provisional” but undescribed species. Cymothoida and Asellota are the most diverse of the six suborders, accounting for ca. 36% and 29% of the species, respectively. Valvifera and Sphaeromatidea are the next most speciose suborders with between 13–15% of the species each, while the suborder Limnorioidea represents fewer than 2% of the SCB isopod fauna. Finally, the mostly terrestrial suborder Oniscidea accounts for ca. 5% of the species treated herein, each which occurs at or above the high tide mark in intertidal habitats. A key to the suborders and superfamilies is presented followed by nine keys to the SCB species within each of the resultant groups. Figures are provided for most species. Bathymetric range, geographic distribution, type locality, habitat, body size, and a comprehensive list of references are included for most species.

## Keywords

Baja California, intertidal, isopod crustaceans, keys to species, northeastern Pacific, southern California, subtidal

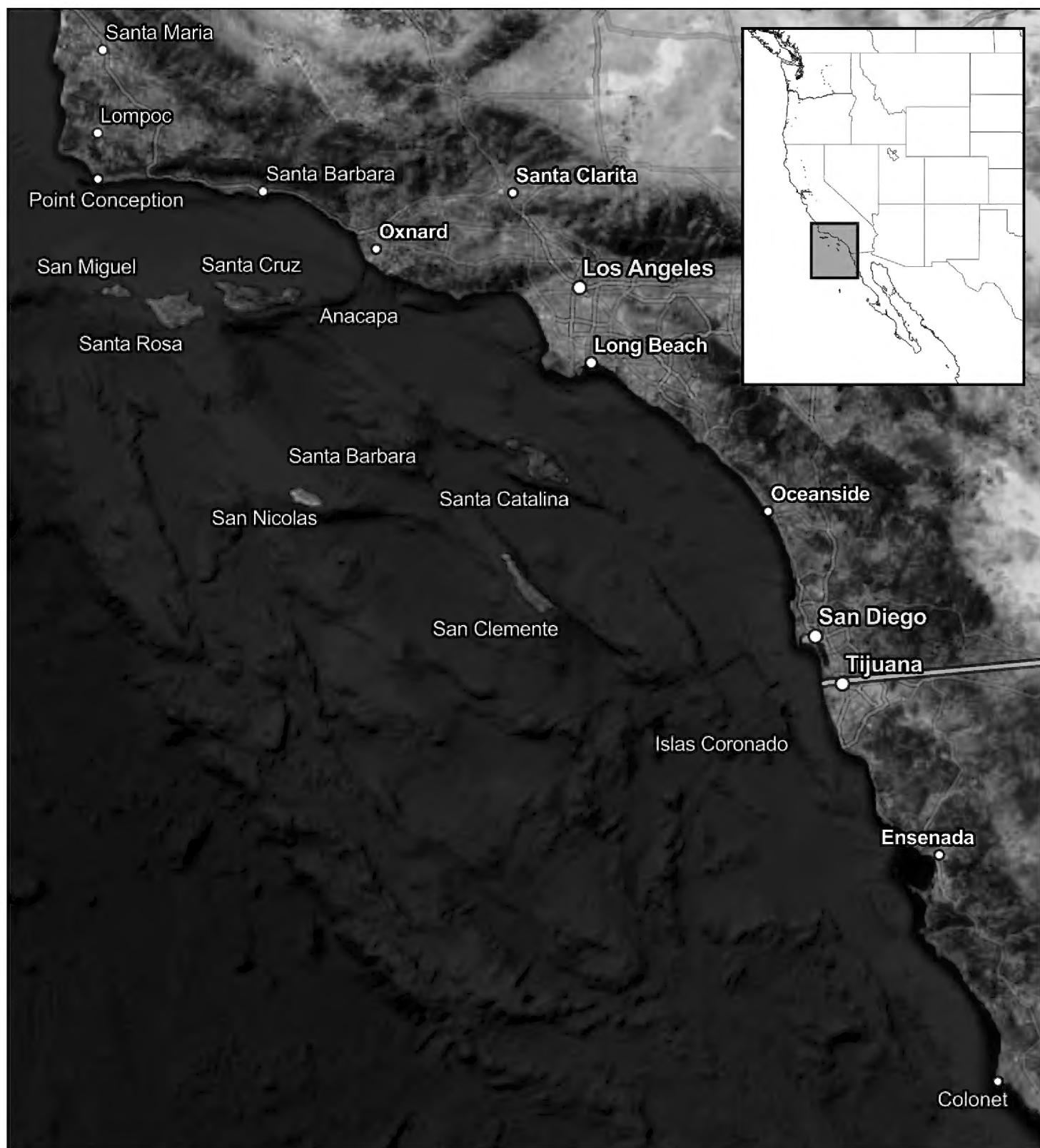
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## Introduction

The Southern California Bight (SCB) is an important ecological region and economic resource that extends more than 600 km from Point Conception, California, USA to Cabo Colonet, Baja California, Mexico in the northeastern Pacific Ocean (Fig. 1). Because of its diverse and productive coastal ecosystems (e.g., rocky and sandy beach intertidal habitats, marshes, bays, lagoons, and estuaries, nearshore kelp forests and reefs, and offshore soft-bottom and hard-bottom benthic habitats of the continental shelf, slope, basins, and submarine canyons), and its proximity to dense human populations and associated pollutant inputs, the SCB is the focus of some of the largest and most comprehensive ocean monitoring programs in the world (Schiff et al. 2002, 2016, 2019). A key component of these programs is documenting changes in bottom dwelling invertebrate communities over space and time. In the SCB these include long-term localized programs conducted by four major wastewater discharge agencies (see City of San Diego 2018; Los Angeles County Sanitation Districts 2020; City of Los Angeles 2021; Orange County Sanitation District 2022), as well as broader regional programs that have been conducted every 4 or 5 years since 1994 (e.g., Allen et al. 1998, 2002, 2007, 2011; Bergen et al. 1998; Ranasinghe et al. 2003, 2007, 2012; Gillett et al. 2017, 2022; Walther et al. 2017; Wisenbaker et al. 2021). Key to the success of these and other programs and surveys is assuring taxonomic standardization of the resultant macroinvertebrate data sets. Fortunately, the SCB has also been home to the Southern California Association of Marine Invertebrate Taxonomists (SCAMIT) since 1982, whose members have ensured the production of accurate and reliable information for the region's macrobenthic invertebrate fauna since that time.

Isopoda (Crustacea: Peracarida) is a diverse and ancient order of crustaceans comprising more than 10,600 living marine, freshwater and terrestrial species known worldwide (see Boyko et al. 2008 onwards). Several recent reviews have focused on the diversity and distribution of the major groups of isopods throughout the world. These include global re-



**Figure 1.** Southern California Bight region from Point Conception, California, USA to Punta Colonet, Baja California, Mexico, including the eight Channel Islands and Islas Coronado.

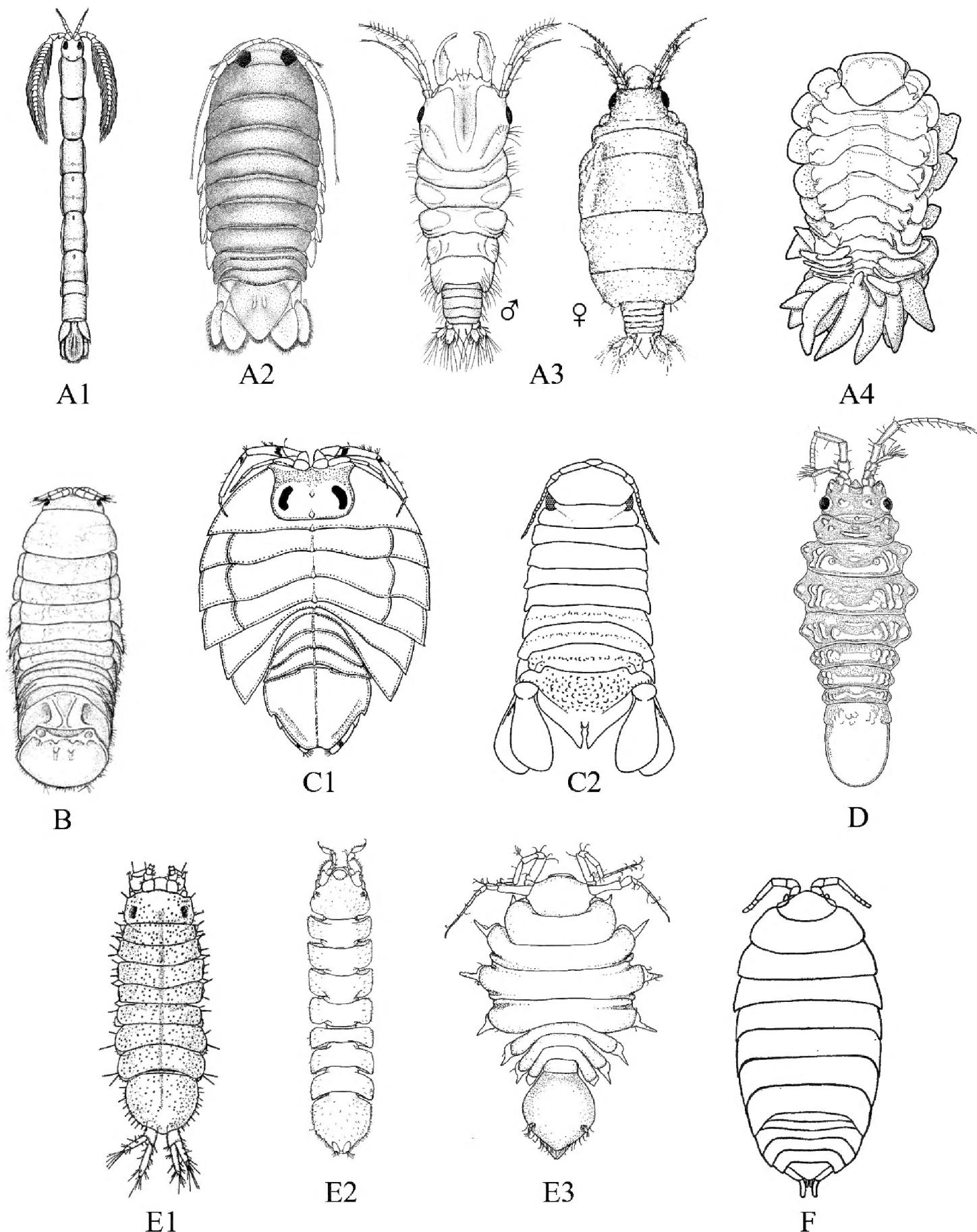
views of the biodiversity of freshwater isopods (Wilson 2008a), the marine isopods exclusive of the epicarideans and asellotes (Poore and Bruce 2012), the bopyrid and cryptoniscid isopods that are ectoparasitic on other crustaceans (McDermott et al. 2010; Williams and Boyko 2012), and the cymothoid isopods that are parasites of marine and freshwater fishes (Smit et al. 2014). Also see Smit et al. (2019) for a review of the current state of knowledge for the various parasitic crustacean taxa, including the isopods. Overall, the isopods are well represented in the SCB with more than 130 species listed in SCAMIT (2021).

There are a number of general monographs, natural history guides, taxonomic keys, and other works relevant to the coastal marine invertebrates of the northeastern Pacific

Ocean that contain useful information on SCB isopods even though many are focused on regions further to the north or south and in the Gulf of California (e.g., Richardson 1905a; Ricketts and Calvin 1952, 1968; Menzies and Barnard 1959; Johnson and Snook 1967; Schultz 1969; Kozloff 1974, 1983, 1996; Miller 1975; Allen 1976; Brusca and Brusca 1978; Brusca 1980; Lee and Miller 1980; Ricketts et al. 1985; Hinton 1987; Wetzer and Brusca 1997; Wilson 1997; O’Clair and O’Clair 1998; Sept 2002, 2019; Brusca et al. 2004, 2007; Kerstitch and Bertsch 2007). Additional information is included in several species checklists (e.g., Leistikow and Wägele 1999; Espinosa-Pérez and Hendrickx 2001a, 2006; Schmalfuss 2003; Campos and Villarreal 2008). However, except for treatments of the southern California coastal shelf and submarine canyons from more than 50 years ago (Menzies and Barnard 1959; Schultz 1966), a more recent survey of the offshore benthos of the Santa Maria Basin and Western Santa Barbara Channel in the northern SCB (Wetzer and Brusca 1997; Wilson 1997), and a guide to the intertidal and supralittoral species of the California and Oregon coasts (Brusca et al. 2007), most information on the coastal isopods of the region remains scattered amongst various taxonomic or ecological contributions. Consequently, there is presently no single comprehensive treatment of the SCB coastal isopod fauna.

The purpose of this guide is to review all macrobenthic species of isopods known or expected to occur in littoral or sublittoral marine habitats of the SCB. Most of these isopods are free-living species that inhabit soft or hard bottom habitats ranging from the upper intertidal to offshore continental shelf and upper slope (depths < 500 m), as well as inland bays and estuaries. Additional species that occur in deeper waters of the lower continental slope, nearshore basins, submarine canyons, and around oceanic islands in the region are also included. Some species are typically associated with more specific microhabitats or niches. For example, these include isopods living on or within sponges (e.g., some sphaeromatids and asellotes), species living commensally with other isopods or echinoderms (e.g., some asellotes and idoteids), species living on or closely associated with kelp or other marine algae (e.g., many idoteids), species that burrow into wood, algal holdfasts or other substrates (e.g., limnoriids and some sphaeromatids), species that are micropredators or temporary parasites of fishes (e.g., aegids, cirolanids, corallanids, gnathiids), and species that are obligate parasites of other crustaceans (epicarideans) or fishes (cymothoids). Finally, although the focus of this review is on marine isopods, halophilic or semi-terrestrial species within the suborder Oniscidea that occur at or just above the high tide line in many SCB intertidal areas are also included.

A key to the suborders and superfamilies of marine isopods occurring in the SCB is provided, which is followed by nine subsequent keys that identify the local isopod fauna to species. Some representative body types for the major groups are illustrated in Fig. 2. Dorsal whole-body illustrations are included for most species. Unless otherwise noted, these figures were reproduced or modified after original species descriptions or other sources as credited in their respective captions and the list of references. Additional figures illustrating enlarged views of specific diagnostic features referred to in the keys are provided where possible. For provisional (undescribed) species where no figures exist, an image of a representative congener



**Figure 2.** Examples of representative family-level body types for each of the six suborders of marine isopods occurring in the SCB. **A** suborder Cymothoida **A1** Anthuridae (*Haliophasma geminatum*) **A2** Cirolanidae (*Cirolana harfordi*) **A3** Gnathiidae (*Gnathia tridens*, male and female) **A4** Bopyridae (*Munidion pleuroncodis*) **B** suborder Limnorioidea, Limnoriidae (*Limnoria quadripunctata*) **C** suborder Sphaeromatidea **C1** Serolidae (*Heteroserolis carinata*) **C2** Sphaeromatidae (*Dynoides elegans*) **D** suborder Valvifera, Idoteidae (*Synidotea magnifica*) **E** suborder Asellota **E1** Janiridae (*Janiropsis analoga*) **E2** Joeropsididae (*Joeropsis concava*) **E3** Paramunnidae (*Pleurogonium californiense*) **F** suborder Oniscidea, Alloniscidae (*Alloniscus perconvexus*).

is included if available. A series of endnotes to these keys is provided that includes comprehensive additional information useful in the identification or classification of specific taxa, but which does not fit neatly in the annotated list of species. This list follows the endnote section and includes bathymetric and geographic distribution information, type locality, brief habitat notes, maximum body size, and the primary taxonomic, biogeographical, and ecological literature references for each species. Our effort focuses on summarizing and organizing current biodiversity data for the SCB marine isopods and is our best attempt at bringing together their morphological, habitat, and distributional data. Although by no means exhaustive, we recognize that available illustrations in many instances are less than ideal. Presenting primarily dorsal whole-body figures is a means of standardizing taxonomic diversity and aiding in the identification of different species, but we acknowledge it is not always the best depiction of a given taxon. Other views are often readily available, and we encourage the reader to refer to the cited and original descriptions for greater detail.

## Materials and methods

### Species review

All species currently recognized by the Southern California Association of Marine Invertebrate Taxonomists (SCAMIT 2021), as well as previously by the organization (SCAMIT 1994–2018) were reviewed and changes (e.g., additions, deletions, synonymies) verified. Additional species were added based on reviews of original species descriptions, taxonomic monographs, species or habitat guides, ecological studies, and published reports of site-specific or regional surveys conducted in the Southern California Bight (SCB) or elsewhere, as well as by personal observations and examination of field or museum specimens by the authors.

### Classification and terminology

The higher-level classification of crustaceans and isopods has evolved over the past two decades, with 11 isopod suborders currently recognized, of which eight include marine species (e.g., see Martin and Davis 2001; Brandt and Poore 2003; Ahyong et al. 2011; Boyko et al. 2013; Wetzer et al. 2013; Martin et al. 2014; Wetzer 2015). The treatment followed herein for the SCB isopods reflects that presently accepted by the World Register of Marine Species (WoRMS: Boyko et al. 2008 onwards) and SCAMIT (2021), with any differences between these lists addressed in the endnotes or annotated species list following the keys.

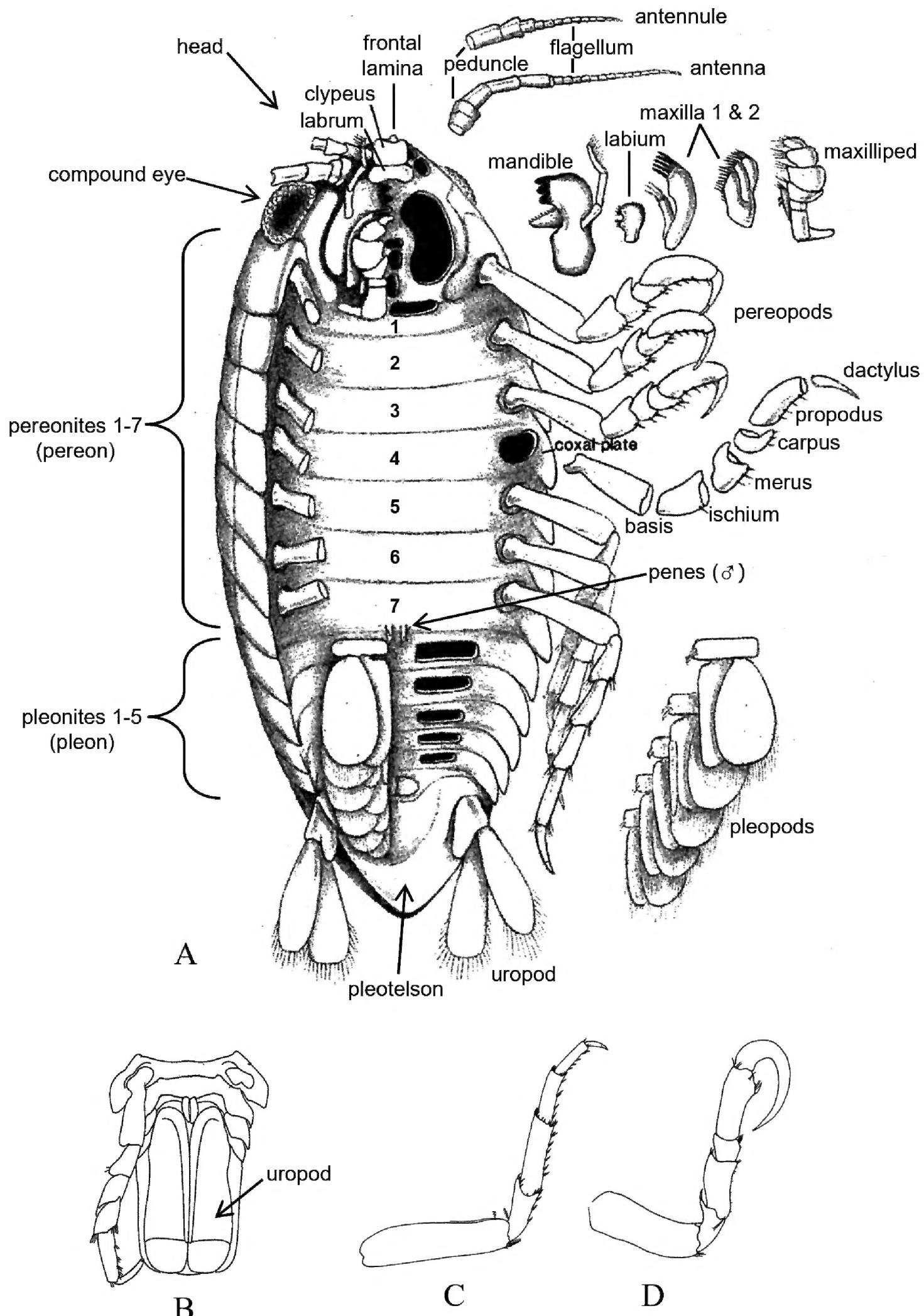
The Isopoda Latreille, 1817 can be distinguished from the other peracarid orders, and crustaceans in general, by the following combination of characters (after Brusca and Iverson 1985; Wetzer et al. 1997; Brusca et al. 2007).

1. Body usually dorsoventrally depressed but may be cylindrical or tubular in some suborders (e.g., Anthuridea and Phreatoicidea).

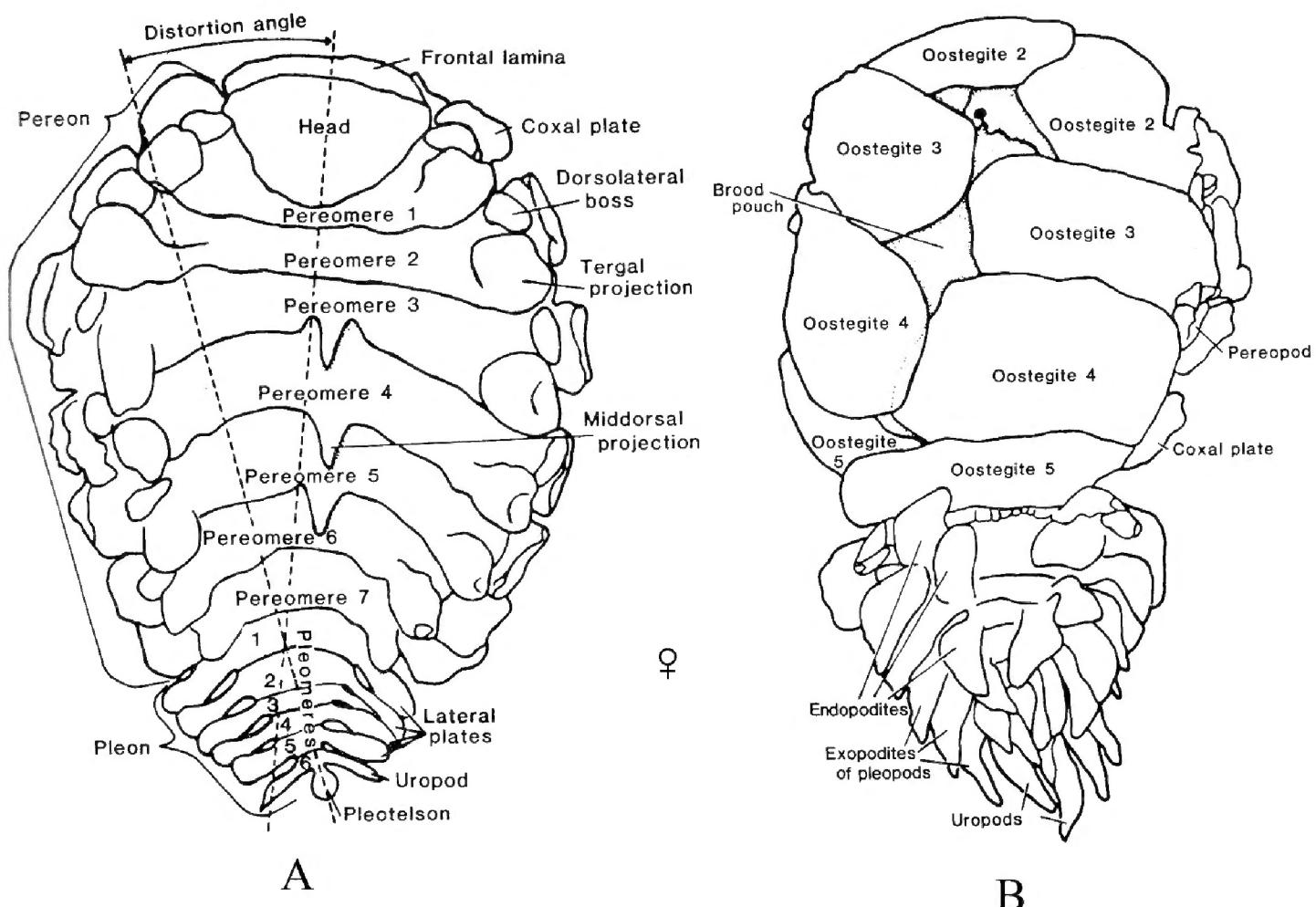
2. Body without a carapace but with a cephalic shield.
3. Head (cephalon) compact, typically with compound eyes, two pairs of antennae (first pair minute in Oniscidea), and mouthparts comprising one pair of mandibles, two pairs of maxillae, and one pair of maxillipeds.
4. Compound eyes sessile (not stalked) but may be on ocular lobes in some Asellota, Cymothoida (i.e., Gnathiidae), and Valvifera.
5. First and second antennae (antennules and antennae, respectively) uniramous, but with minute scales in a few taxa.
6. Mandible usually with a 1- to 3-articulate palp and a multidentate incisor process, left and right lacinia mobilis often differ, molar process highly variable.
7. First and second maxillae (maxillules and maxillae, respectively) without palps.
8. First thoracic appendages (thoracopods) modified as maxillipeds comprising fifth pair of mouthparts.
9. Long thorax of eight segments (thoracomeres), the first (and second in Gnathiidae) fused to the cephalon and bearing the maxillipeds, the remaining seven segments (pereonites) being free and collectively comprising a region called the pereon.
10. Pereon with seven pairs of uniramous legs (pereopods), all generally alike; the exception being the Gnathiidae in which only five pairs of walking legs are present.
11. Abdomen (pleon) relatively short comprising six somites (pleonites), at least one of which is always fused to the telson to form a pleotelson.
12. Six pairs of biramous pleonal appendages, including five pairs of plate-like pleopods specialized for respiration and/or swimming, and one pair of fan-like or stick-like, uniarticulate uropods.
13. Heart located primarily in the pleon.
14. Young isopods develop within a brood pouch (female's marsupium) and emerge as a manca before appearance of the last pair of pereopods. Mancas have six pairs of pereopods.
15. Biphasic molting in which the posterior half of the body molts before the anterior half.

In terms of reproductive status, isopods can be sexed based on the presence or absence of male or female secondary sex characters. If oostegites (or a marsupium) are present with or without eggs or developing embryos, an individual is obviously female. If oostegites are absent, males can be distinguished by the presence of paired penes (may be fused) on the sternum of pereonite 7 (or pleonite 1) and/or appendices masculinae on the endopods of the second pleopods. Absence of all these characters indicates that the individual is either a juvenile, an immature female, or an immature male that has not yet developed secondary sexual features.

Terminology in the keys follows that which is typical for isopods in general (see Brusca and Iverson 1985; Kensley and Schotte 1989; Brusca and Wilson 1991; Wetzer et al. 1997; Brusca et al. 2007). The generalized isopod body plan characteristic of most groups is diagrammed in Fig. 3A, while Fig. 4 shows the specialized body plan characteristic of an adult female bopyrid (i.e., representative epicaridean). See Cohen and Poore (1994: fig. 1) for a detailed diagram of a stylized male gnathiid isopod.



**Figure 3. A** Generalized isopod body plan (modified after Kensley and Schotte 1989: fig. 2) **B** ventral view of valviferan pleon and pleotelson showing opercular uropods (after Poore and Lew Ton 1993: fig. 25) **C** example of ambulatory pereopod (after Brusca 1983a: fig. 11G) **D** example of prehensile pereopod (after Brusca 1983a: fig. 11F).



**Figure 4.** Bopyrid isopod body plan (adult female). **A** dorsal view **B** ventral view. Modified after Markham (1985a: fig. 2).

In general, the isopod body is divided into three regions: the cephalon (head), pereon, and pleon. The cephalic region is referred to as “head” throughout the following keys. The segments of the pereon are referred to as pereonites 1–7 for most taxa or as pereomeres 1–7 for the epicarideans. Likewise, the segments of the pleon are referred to as pleonites 1–5 and the pleotelson (incorporating the fused pleonite 6 and telson) for most taxa (unless fused into fewer segments) or as pleomeres 1–6 plus telson for the epicarideans. The appendages of the pereon are numbered as pereopods 1–7, while the appendages of the pleon are referred to as pleopods 1–5 plus the uropods for all taxa. The first antennae (antenna 1) and second antennae (antenna 2) are referred to as antennules and antennae, respectively. Additional terminology is defined in glossaries of technical terms provided in Martin et al. (2022). Other useful glossaries are included in Kensley and Schotte (1989) and Wetzer et al. (1997), while Brusca and Wilson (1991) provide an extensive detailed description of isopod morphology. Key references regarding taxonomy, systematics, biogeography, and ecology of various isopod taxa are listed below for each suborder represented in this review, while specific references for each species are provided in the annotated species list.

**Suborder Cymothoida:** Primary references for the superfamily Anthuroidea include Menzies and Barnard (1959), Poore (1975, 1980, 1984a, 1984b, 2001a), Wägele (1984a), Poore and Lew Ton (1986, 1988a, 1988b, 1988c, 1988d), Cadien and Brusca (1993), and Annisaqois and Wägele (2021). Key references for the superfamily Cymothooidea are available for the families Aegidae (e.g., Brusca 1983a; Brusca and France 1992; Bruce 2009a), Cirolanidae (e.g., Bruce 1981; Brusca et al. 1995), Corallanidae (e.g., Delaney

1984, 1989), Cymothoidae (e.g., Brusca 1981; Bruce 1990; Smit et al. 2014; Hata et al. 2017), Gnathiidae (e.g., Cohen and Poore 1994; Smit and Davies 2004; Haney 2006; Tanaka 2007; Wilson et al. 2011), and Tridentellidae (e.g., Bruce 1984; Delaney and Brusca 1985). Within the infraorder Epicaridea, the family Bopyridae has been treated in detail in a long series of papers by Markham since the 1970s (e.g., Markham 1974a, 1975, 1977a, 1985a, 1986, 1992, 2001, 2003, 2004, 2008, 2016, 2020), while Boyko and Williams (2021a, 2021b) recently covered the two known local genera of the family Dajidae. Other valuable recent references for bopyrid and dajid isopods include Boyko et al. (2017), Williams et al. (2019), and Williams and Boyko (2021).

**Suborder Limnoriidea:** Key references for the family Limnoriidae include Menzies (1951a, 1957, 1958), Cookson (1991), and Borges et al. (2014).

**Suborder Sphaeromatidea:** Key references for the family Serolidae include Sheppard (1933), Harrison and Poore (1984), Brandt (1988), Wägele (1994), and Bruce (2009b), while important references for the family Ancinidae include Holmes and Gay (1909), Menzies and Barnard (1959), Schultz (1973), Glynn and Glynn (1974), Bruce (1993), and Shimomura (2008). Key references for the Sphaeromatidae include Menzies (1954), Harrison and Holdich (1982, 1984), Harrison and Ellis (1991), Bruce (1993), Schotte (2005), Wetzer et al. (2013, 2018, 2021), Wall et al. (2015), and Wetzer and Mowery (2017).

**Suborder Valvifera:** Key references for the valviferans include Menzies (1950a, 1951b), Sheppard (1957), Menzies and Barnard (1959), Menzies and Miller (1972), Brusca and Wallerstein (1977), Brusca (1983b, 1984), Brandt (1990), Poore and Lew Ton (1990, 1993), Rafi and Laubitz (1990), Wägele (1991), Poore (2001b, 2015), and King (2003).

**Suborder Asellota:** Key references for the asellotes include Menzies (1951b, 1952), Menzies and Barnard (1959), George and Strömberg (1968), Hessler et al. (1979), Wilson and Hessler (1980, 1981), Poore (1984c), Wilson (1987, 1994, 1997, 2008b), Wilson and Wägele (1994), Serov and Wilson (1995), Just and Wilson (2004, 2007, 2021), Doti and Wilson (2010), and Brix et al. (2021).

**Suborder Oniscidea:** Useful references for the oniscids include Van Name (1936, 1940, 1942), Garthwaite et al. (1985, 1992), Garthwaite and Lawson (1992), Leistikow and Wägele (1999), Schmalfuss (2003), Schmidt and Leistikow (2004), Schmidt (2008), and Sfenthourakis and Taiti (2015).

## Results

### Biodiversity

A total of 190 species of isopods are covered in this review of the Southern California Bight (SCB) isopod fauna, representing 105 genera, 42 families, and six suborders (Appendix 1). These include all but two of the 132 species-level taxa currently recognized by SCAMIT (2021)<sup>Endnote 1</sup>. Approximately 84% of these isopods represent described species (see Boyko et al. 2008 onwards), while the remaining 16% represent well-documented “provisional” but undescribed species.

Of the six isopod suborders occurring in SCB coastal and offshore waters, the Cymothoida and Asellota are the most diverse, accounting for ~ 36% and 29% of the species, respectively (Table 1). The Valvifera and Sphaeromatidea are the next most speciose suborders, accounting for ~ 13–15% of species, while the suborder Limnoriidea is represented by only three species (< 2%) in SCB waters. Finally, the suborder Oniscidea is represented by nine species (~ 5%) that occur at the terrestrial-marine interface in several intertidal areas of the SCB. See Brusca et al. (2007) or contact R Wetzer for more complete lists of California oniscid isopods.

The suborder Cymothoida is represented by 69 species distributed amongst four superfamilies (Anthuroidea, Cymothooidea, Bopyroidea, Cryptoniscoidea) and 15 families. The superfamily Anthuroidea, characterized by long, thin, cylindrical bodies usually at least 6 × longer than wide, includes 11 species in five families. Most anthuroids are thought to feed on other small invertebrates and occur in the SCB amongst fouling communities in marinas, bays, and harbors, and in both littoral and sublittoral habitats on the outer coast from the low intertidal to soft and hard-bottom benthos of the continental shelf, slope, and submarine canyons (0–1300 m depths).

The superfamily Cymothooidea is represented by six families with 38 species. Five of these families (Aegidae, Cirolanidae, Corallanidae, Cymothoidae, Tridentellidae) are generally similar in body form with sleek symmetrical bodies usually ~ 2–6 × longer than wide, the uropods and pleotelson forming a distinct tail fan, and the pereopods modified from ambulatory to prehensile reflecting their different lifestyles (e.g., Fig. 3C, D). For example, the family Cirolanidae is represented by seven species with mostly ambulatory pereopods, although pereopods 1–3 tend to have well-developed dactyli modified for grasping. In the SCB, these species occur intertidally on both sandy and rocky beaches,

**Table 1.** Number of families, genera, and species for each of the six isopod suborders occurring in littoral and sublittoral marine habitats of the Southern California Bight. For suborders represented by more than one superfamily, the breakdown per superfamily is indicated.

Suborder/Superfamily	Number taxa per group		
	Families	Genera	Species
<b>Suborder Cymothoida</b>	<b>15</b>	<b>47</b>	<b>69</b>
Superfamily Anthuroidea	5	10	11
Superfamily Cymothooidea	6	18	38
Infraorder Epicaridea			
Superfamily Bopyroidea	2	16	17
Superfamily Cryptoniscoidea	2	3	3
<b>Suborder Limnoriidea</b>	<b>1</b>	<b>1</b>	<b>3</b>
<b>Suborder Sphaeromatidea</b>	<b>4</b>	<b>12</b>	<b>25</b>
Superfamily Seroloidea	1	1	1
Superfamily Sphaeromatoidea	3	12	24
<b>Suborder Valvifera</b>	<b>4</b>	<b>12</b>	<b>29</b>
<b>Suborder Asellota</b>	<b>12</b>	<b>26</b>	<b>55</b>
Superfamily Janiroidea	11	25	54
Superfamily Stenetrioidea	1	1	1
<b>Suborder Oniscoidea</b>	<b>6</b>	<b>6</b>	<b>9</b>
<b>Total taxa</b>	<b>42</b>	<b>105</b>	<b>190</b>

as well as in shallow to deep water habitats of the continental shelf, slope, and basins (0–1250 m depths). Corallanidae and Tridentellidae, represented by two species each in the SCB, are similar in shape to the cirolanids, but with the mouthparts and anterior pereopods modified for a predatory lifestyle. For example, the dactyli of pereopods 1–3 are usually as long or longer than the propodi and thus adapted for grasping prey. The two SCB corallanids occur from the intertidal to 138 m on the continental shelf, while the two SCB tridentellids have been reported from offshore depths of 53–360 m. The family Aegidae is represented by seven species in the SCB, all of which are temporary parasites of marine fishes and are characterized by prehensile pereopods 1–3 (dactylus strongly recurved and as long or longer than propodus). These species have been reported from the intertidal to deep waters of the continental shelf, slope, basins, and oceanic islands (0–2534 m depths). Although somewhat similar in general body form to the above four families, species of Cymothoidae are even more highly modified for a parasitic lifestyle with all seven pairs of pereopods being strongly prehensile. All cymothoids are obligate parasites of marine or freshwater fishes, most commonly being found attached in the gill chamber or buccal region of their host. Nine species of cymothoids are recognized herein as parasitizing a wide range of marine fishes in nearshore to offshore coastal waters of the SCB.

The sixth family of Cymothooidea occurring in SCB waters is Gnathiidae of which the males are highly modified and characterized by only six free pereonites and five pairs of pereopods. Eleven species of gnathiids are reported in the SCB, including three that are awaiting formal description. These 11 species occur in a wide range of habitats from the intertidal to shallow subtidal, and from the benthos of the offshore continental shelf, slopes, and submarine canyons to depths of ~ 1400 m.

Bopyroidea and Cryptoniscoidea comprise the remaining two superfamilies of Cymothoida, both of which are highly modified obligate parasites of other crustaceans. Bopyroidea is represented by 17 species in two families (Bopyridae and Ionidae) in shallow to deep SCB waters. Sixteen of these species are branchial parasites of a wide range of decapod crustaceans (e.g., hermit crabs, shrimp, mud shrimp, ghost shrimp, galatheid crabs, squat lobsters, porcelain crabs, grapsid crabs) while one species is an abdominal parasite of mud shrimp. In contrast, Cryptoniscoidea is represented by only three species in two families. These include Dajidae represented herein by at least two species that are ectoparasites on the dorsal carapace of several species of shrimp, and Hemioniscidae represented by a single species that is an ectoparasite of barnacles.

The suborder Limnoriidea is represented by three species of the family Limnoriidae in SCB waters. All three species occur in shallow waters (0–30 m depth) where they burrow into either wood (2 species) or algal holdfasts (1 species).

The suborder Sphaeromatidea is represented by 25 species in SCB waters distributed between two superfamilies (Seroloidea and Sphaeromatoidea) and four families. The serolids (family Serolidae) presently include only a single recognized species in the SCB, *Heteroserolis carinata*, which burrows just beneath the sediment surface from shallow waters in bays and harbors, and offshore to depths of ~ 100 m. However, it is possible that shallow vs. deep water populations in the region represent two distinct species (TDS, pers. obs.). In contrast, the superfamily Sphaeromatoidea includes 24 species in three families. Of these, the family Sphaeromatidae is the most diverse, represented herein by a total of

20 species. Most of these species occur from intertidal to shallow subtidal habitats < 30 m depth, although two species, *Discerceis granulosa* and *Paracerceis gilliana*, have been reported from slightly deeper waters between 37–73 m. The other two sphaeromatoid families, Ancinidae and Tecticipitidae, are represented by only three and one species, respectively. All four of these species occur in intertidal or shallow subtidal habitats (< 30 m depths).

The suborder Valvifera can be distinguished from all other local isopods by the possession of hinged opercular uropods that cover the ventral surface of the pleon and pleotelson enclosing the pleopods (see Fig. 3B). Four families and 29 species of valviferans are represented in SCB waters. Idoteidae is the most diverse of these families, comprising 23 species in the study area. Many of these species, especially within the genera *Colidotea*, *Erichsonella*, *Eusymmerus*, *Idotea*, *Pentidotea*, and *Stenosoma* are most common in intertidal and shallow subtidal habitats associated with various species of kelp or algae. In contrast, the two local species of *Edotia* occur in soft-bottom habitats of the continental shelf between depths of ~ 14–64 m, while three of the four SCB species of *Synidotea* (except *S. harfordi*) occur on the shelf or slope at depths of ~ 30–800 m. The remaining three families of SCB valviferans comprise a total of six species. The family Arcturidae is represented by four species that occur in the low intertidal (1 species) or offshore shelf benthos (3 species) at depths < 100 m. The last two families are each represented by a single species. These include *Cleantioides occidentalis* of the Holognathidae in relatively shallow waters (intertidal to ~ 50 m), and *Califarcturus tannerensis* of the Thermoarcturidae in deep waters (~ 1200–1300 m).

The suborder Asellota is represented by 55 species in SCB waters distributed between two superfamilies (Janiroidea and Stenetrioidea) and 12 families. However, only ~ 64% of these species are formally described, with the remaining 36% representing provisional species (see Appendix 1). Stenetrioidea includes a single species (*Stenetrium* sp. A) reported from 90–131 m in the Santa Maria Basin. In contrast, Janiroidea is represented by a diverse group of 11 families that occur in a wide range of habitats and depths from the intertidal to nearly 4000 m. Janiridae is the most diverse of these families, comprising 18 species; ca. two-thirds of the janirids occur in shallow waters from the intertidal to depths of ~ 30 m, while the remaining third occur on the continental shelf at depths between ~ 30–200 m. Paramunnidae is the next most diverse family with nine species, two of which occur in the shallow subtidal (9–20 m) and seven on the continental shelf (75–197 m). Munnidae is the third most diverse family with eight species, of which five species occur in intertidal to shallow subtidal habitats, two species occur at mostly shelf depths (12–237 m), and one species occurs in deeper slope waters (500 m). The Munnopsidae is represented by six species that occur at depths between 73–1118 m. The Joeropsididae is represented by five species that occur at depths from the intertidal to 161 m, while the Desmosomatidae includes three species that range in depth from ~ 100–3000 m. The remaining five families are each represented by a single species. These include Dendrationidae (*Acanthomunna tannerensis* at ~ 600–800 m), Haplomunnidae (*Haplomunna caeca* at ~ 4000 m), Lepidocharontidae (*Microcharon* sp. A at 75 m), Nannoniscidae (*Nannoniscus latipleonus* at ~ 300–500 m), and Pleurocopidae (*Pleurocope* sp. A at < 1 m).

The suborder Oniscidea is represented in this review by nine species distributed between six families. Each of these species typically occurs at or above the high tide mark in

its respective habitat. The families Alloniscidae (2 species) and Tylidae (1 species) occur on sandy beaches in the SCB. The Detonidae (3 species) and Halophiloscidae (1 species) both occur in marshes, bays, and estuaries. The Platyarthridae (1 species) is reported to occur on both sandy beaches and at the edges of marshes. The Ligiidae is represented herein by a single species that typically occurs in the spray zone on rocky intertidal shores.

## Keys to species

Ten keys were constructed to facilitate identification of the 190 species of isopods included in this guide. Key A represents a key to the suborders and main superfamilies, which are then identified to species in Keys B–J. Keys B–E cover the suborder Cymothoida (superfamilies Anthuroidea, Cymothooidea, Bopyroidea, and Cryptoniscoidea). Key B covers the Anthuroidea (5 families, 11 species). Key C covers the families Aegidae, Cirolanidae, Corallanidae, Cymothoidae, and Tridentellidae of Cymothooidea (27 species). Key D covers the remaining cymothooidean family, Gnathiidae (11 species). Key E covers the epicaridean superfamilies Bopyroidea and Cryptoniscoidea (4 families, 20 species). Key F covers the suborder Limnoriidea (1 family, 3 species). Key G covers the superfamilies Seroloidea and Sphaeromatoidea of the suborder Sphaeromatidea (4 families, 25 species). Key H covers the suborder Valvifera (4 families, 29 species). Key I covers the superfamilies Janiroidea and Stenetrioidea of the suborder Asellota (12 families, 55 species). Key J covers the suborder Oniscidea (6 families, 9 species).

### Key A. Suborders and Superfamilies of SCB Marine Isopods

- 1 Adult isopods free-living, but may live commensally with other isopods or invertebrates; females and males with clear bilateral symmetry, typically similar in size; antennae well developed, never vestigial; antennules variable ..... **2**
- Adult isopods obligate parasites of other crustaceans; females with slightly to highly distorted or reduced bilateral symmetry; male minute, bilaterally symmetrical, living on body of adult female; antennae vestigial in female; antennules reduced to  $\leq 3$  articles [Suborder Cymothoida: Superfamilies Bopyroidea and Cryptoniscoidea] ..... **Key E**
- 2 Adult isopods with 5 pairs of pereopods (thoracomere 2 fused to cephalon with its appendages modified into pylopods; thoracomere 8 reduced, without legs); adult males with enlarged, forward projecting forceps-like mandibles; females without mandibles [Suborder Cymothoida: Superfamily Cymothooidea (in part), Family Gnathiidae] ..... **Key D**
- Adult isopods usually with 7 pairs of distinct pereopods (7<sup>th</sup> pair may be small and folded against ventral body wall in juveniles); newly released isopods (mancas) from the marsupium with only 6 pairs of pereopods; males without projecting forceps-like mandibles; females with mandibles ..... **3**
- 3 Species terrestrial or halophilic, mostly restricted to upper littoral (e.g., high tide line, spray zone) or brackish water habitats along coast; antennules vestigial,

minute; pleon always composed of 5 free pleonites plus pleotelson [Suborder Oniscidea: Superfamily Oniscoidea] ..... **Key J**

– Species fully marine, occurring in littoral or sublittoral habitats; antennules normal, or not minute if reduced; pleon variable, with or without fused pleonites ..... **4**

**4** Uropods operculate, modified into pair of ventral covers (opercula) enclosing the pleopods (Fig. 3B), but do not confuse with operculate pleopods [Suborder Valvifera] ..... **Key H**

– Uropods not modified as ventral opercula, hinged laterally or terminally on pleotelson ..... **5**

**5** Uropods typically flattened and hinged on anterolateral margins of pleotelson (may be greatly reduced) ..... **6**

– Uropods styliform and hinged terminally or nearly so on posterior margins of pleotelson [Suborder Asellota: Superfamilies Janiroidea and Stenetrioidea] ..... **Key I**

**6** Adult body elongated, usually  $> 6 \times$  longer than wide [Suborder Cymothoida: Superfamily Anthuroidea] ..... **Key B**

– Adult body not elongated,  $< 4 \times$  longer than wide (not elongated) ..... **7**

**7** Uropods greatly reduced with small claw-like exopods, generally not visible dorsally; species burrow in wood or algal holdfasts [Suborder Limnoriidea: Superfamily Limnorioidea] ..... **Key F**

– Uropods not as above, clearly visible dorsally as expanded, flattened “tail fan” or long caudal processes ..... **8**

**8** Pleon composed of 4 or 5 free pleonites plus pleotelson [Suborder Cymothoida: Superfamily Cymothooidea (in part), Families Aegidae, Cirolanidae, Corallanidae, Cymothoidae, and Tridentellidae] ..... **Key C**

– Pleon composed of  $\leq 3$  free pleonites plus pleotelson [Suborder Sphaeromatidea: Superfamilies Seroloidea and Sphaeromatoidea] ..... **Key G**

### Key B. Suborder Cymothoida, Superfamily Anthuroidea

Figs 5, 6

**1** Eyes present ..... **2**

– Eyes absent ..... **10**

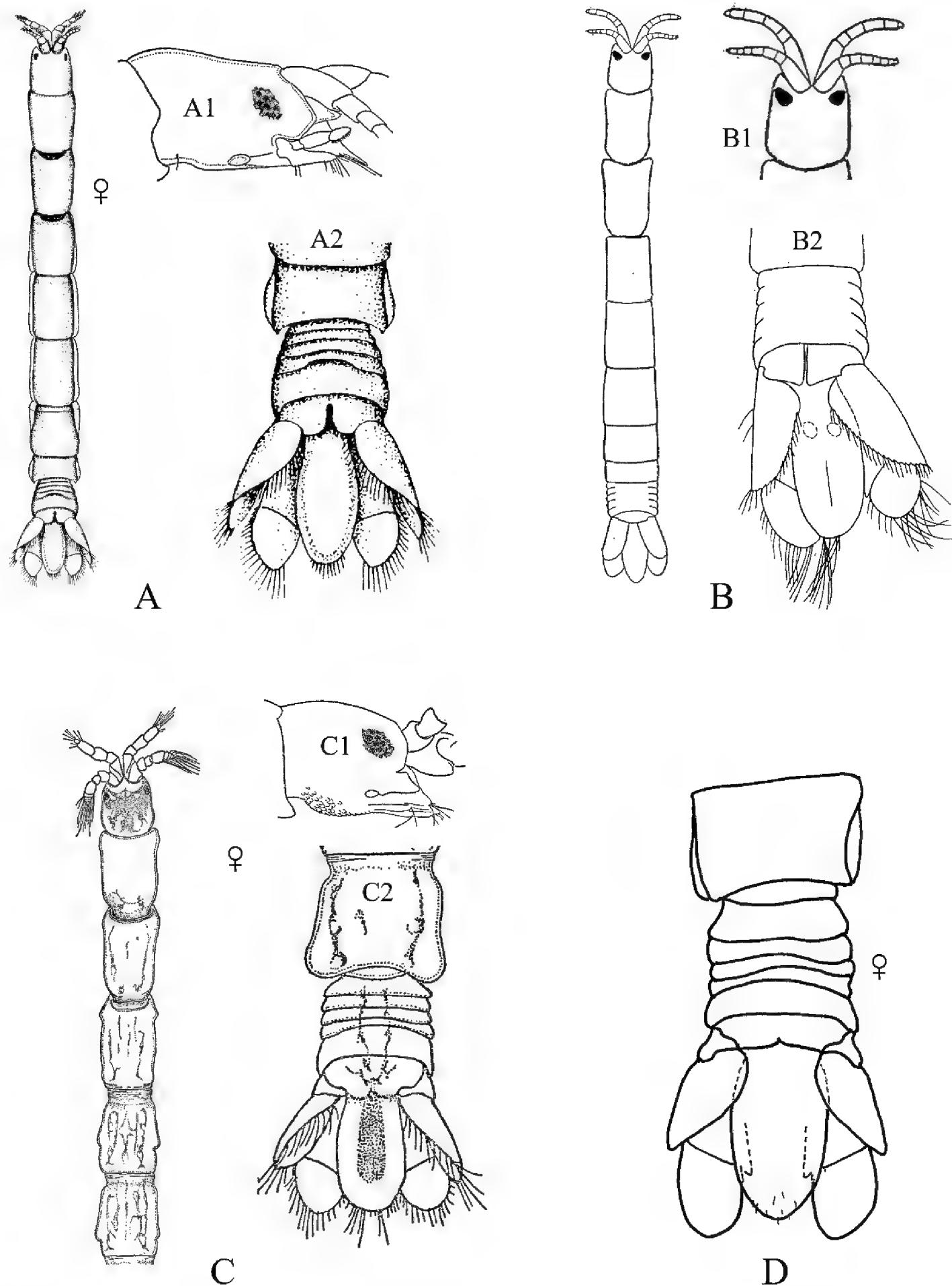
**2** Mouthparts form forward directed cone-like structure under the head, adapted for piercing and sucking ..... **3** [Paranthuridae]

– Mouthparts not forming ventral cone-like structure, adapted for biting and chewing ..... **6**

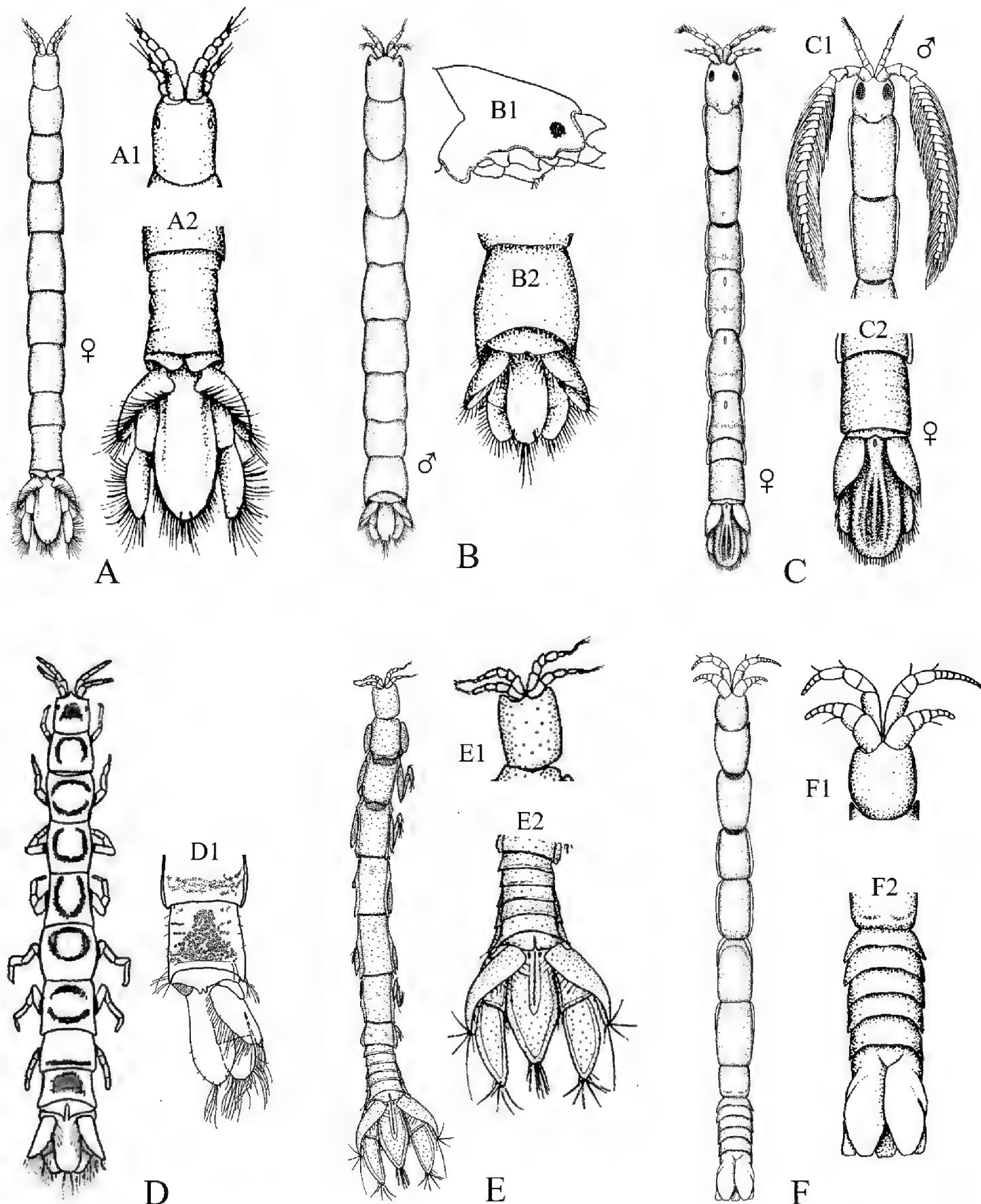
**3** Pereon composed of 7 distinct, well-developed pereonites with 7 pairs of pereopods; pereonite 7 ca. half as long as pereonite 6 and visible laterally ..... **4**

– Pereon composed of 6 distinct pereonites with 6 pairs of pereopods (7<sup>th</sup> pereopods absent); pereonite 7 very short,  $< 20\%$  as long as pereonite 6, not visible laterally ..... **5**

**4** Pleonites 1–5 free, not fused; pleonite 5 ca.  $3 \times$  longer than other pleonites (Fig. 5A) ..... *Paranthura elegans*



**Figure 5.** Isopoda, Cymothoida, Anthuroidea, Paranthuridae: **A** *Paranthura elegans* **A1** lateral view of head (piercing mouthparts) **A2** dorsal view of pereonite 7, free pleonites 1–5, pleotelson and uropods (after Menzies 1951b; Wetzer and Brusca 1997) **B** *Paranthura japonica* **B1** dorsal close-up view of head **B2** dorsal view of fused pleonites 1–5, pleotelson and uropods (after Richardson 1909; Brusca et al. 2007) **C** *Califanthura squamosissima* (male with antenna loaded with aesthetascs) **C1** lateral view of head (piercing mouthparts) **C2** dorsal view of pereonites 6 and 7, dorsally fused pleonites 1–5, pleotelson and uropods (after Menzies 1951b) **D** *Colanthura bruscai*, dorsal view of pereonites 6 and 7, free pleonites 1–5, pleotelson and uropods (after G. Poore, personal contribution).



**Figure 6.** Isopoda, Cymothoida, Anthuroidea, Anthuridae: **A** *Amakusanthura californiensis* **A1** dorsal close-up view of head **A2** dorsal view of pereonite 7, dorsally fused pleonites 1–5, pleotelson and uropods (after Wetzer and Brusca 1997) **B** *Cyathura munda* **B1** lateral view of head (biting mouthparts) **B2** dorsal view of pereonite 7, dorsally fused pleonites 1–5, pleotelson and uropods (after Menzies 1951b) **C** *Haliophasma geminatum* **C1** dorsal view of head and pereonites 1 and 2 of male **C2** dorsal view of pereonite 7, dorsally fused pleonites 1–5, pleotelson and uropods (after Wetzer and Brusca 1997) **D** *Mesanthura occidentalis* **D1** dorsal view of pereonite 7, dorsally fused pleonites 1–5, pleotelson and right uropod (after Allen 1976). Antheluridae: **E** *Ananthura luna* **E1** dorsal close-up view of head **E2** dorsal view of pereonite 7, free pleonites 1–5, pleotelson and uropods (after Schultz 1966). Hyssuridae: **F** *Kupellonura* sp. A **F1** dorsal close-up view of head **F2** dorsal view of pereonite 7, free pleonites 1–5, pleotelson and uropods (after Wetzer and Brusca 1997).

- Pleonites 1–5 fused mid-dorsally, but distinct laterally; all pleonites of similar length (Fig. 5B) ..... *Paranthura japonica*
- 5 Pleonites 1–5 free, separated from each other by dorsal integumental folds; pleonite 1 ca. 2 × longer than pleonite 2 (Fig. 5D) ..... *Colanthura bruscai*
- Pleonites 1–5 dorsally fused, all pleonites of similar length (Fig. 5C) ....  
..... *Califanthura squamosissima*
- 6 Dorsal surface of pleotelson with median row of spines; uropodal and pleotelsonic margins serrated<sup>Endnote 2</sup> ..... *Eisothistos* sp. A [Expanathuridae]
- Dorsal surface of pleotelson smooth or ridged, without spines; uropodal and pleotelsonic margins not serrated..... 7 [Anthuridae]
- 7 Pleotelson with 3 raised dorsal longitudinal ridges or carinae; uropodal exopods curve up and over base of pleotelson (Fig. 6C) ..... *Haliophasma geminatum*
- Pleotelson without dorsal ridges or carinae; uropodal exopods may or may not curve up over pleotelson..... 8
- 8 Pleonites 1–5 fused only along dorsal midline, segments free laterally and visible dorsally; uropodal exopods ca. half length of endopods and pleotelson, curving up and partially over pleotelson base; uropodal endopods narrow, ca. half as wide as pleotelson (Fig. 6A) ..... *Amakusanthura californiensis*
- Pleonites 1–5 completely fused dorsally; uropodal exopods > 50% length of endopods and pleotelson, may or may not cover the pleotelson dorsally; uropodal endopods broad, subequal in width to pleotelson..... 9
- 9 Dorsal surface of pereon pigmented, with complete or nearly complete dark rings on pereonites 2–6 and posterior transverse band on pereonite 7; uropodal exopods partially cover dorsal surface of pleotelson (Fig. 6D) ..... *Mesanthura occidentalis*
- Dorsal surface of pereon covered with diffuse pigment splotches, but without pigment rings; uropodal exopods do not cover base of pleotelson (Fig. 6B) ....  
..... *Cyathura munda*
- 10 Uropodal exopods with distinct lateral lobes, exopods overlapping broadly to cover almost entire dorsal surface of pleotelson; uropodal rami nearly reach, but do not exceed, posterior margin of pleotelson; tips of uropodal rami without tufts of stiff setae (Fig. 6F) ..... *Kupellonura* sp. A [Hyssuridae]
- Uropodal exopods without lateral lobes, overlapping only base of pleotelson; uropodal endopod distinctly longer than pleotelson; tips of uropodal rami with tufts of long stiff setae (Fig. 6E)..... *Ananthura luna* [Anheluridae]

**Key C. Suborder Cymothoida, Superfamily Cymothooidea (in part): Families Aegidae, Cirolanidae, Corallanidae, Cymothoidae, Tridentellidae**

Figs 7–11

- 1 Pereopods 1–3 ambulatory with dactylus shorter than propodus (e.g., Fig. 3C) ..  
..... 2 [Cirolanidae]
- Pereopods 1–3 prehensile or sub-prehensile with dactylus generally as long as, or longer than propodus and strongly curved (e.g., Fig. 3D) ..... 8

2 Eyes absent; head immersed in pereonite 1 with posterior margin appearing deeply concave; pereon with coxae 4–7 produced beyond posterior margins of their respective pereonites, at least 2 or more visible in dorsal view; lateral margins of pleonite 5 obscured by pleonite 4 (Fig. 7G) ..... *Natatolana californiensis*

– Eyes present; posterior margin of head not appearing distinctly concave; with or without dorsally visible coxae on pereonites; lateral margins of pleonite 5 may or may not be obscured by pleonite 4 ..... 3

3 Coxae of pereonites 2–7 well-developed, typically visible in dorsal view and expanded laterally with acute posterior angles; epimeres of pleonites 2–5 well-developed, expanded laterally, with acute posterior angles; pleotelson with squarish to pointed posterior margin and a strong, middorsal longitudinal ridge; margins of pleotelson and uropodal rami notched (Fig. 7F) ..... *Metacirolana joanneae*

– Pereonites, pleonites, pleotelson and uropods not as above ..... 4

4 Head with prominent spatulate rostral process separating left and right antennules (Fig. 7D, E) ..... 5

– Head without a prominent rostral process between antennules ..... 6

5 Posterior margin of pleotelson broadly rounded and crenulate; antennular peduncle articles 2 and 3 subequal in length (Fig. 7E) ..... *Excirolana linguifrons*

– Posterior margin of pleotelson obtusely rounded and acuminate; antennular peduncle article 3 longer than article 2 (Fig. 7D) ..... *Excirolana chiltoni*

6 Antennules geniculated, with peduncle article 1 longer than articles 2 or 3, and article 2 arising at right angles to article 1; peduncle of antennae with 4 articles, antennae long and extending beyond pereonite 7; lateral margins of pleonite 5 not obscured by pleonite 4; uropodal rami truncate distally, exopod does not extend to posterior margin of pleotelson (Fig. 7C) ..... *Eurydice caudata*

– Antennules not geniculated; peduncle of antennae with 5 articles; lateral margins of pleonite 5 obscured by pleonite 4; uropodal rami distally rounded or acuminate, extending beyond posterior of pleotelson ..... 7

7 Uropodal rami with apical notches and not distally rounded; peduncle articles 1 and 2 of antennules fused; coxae of pereonites 5–7 visible dorsally; pereonites, pleonites and pleotelson without dorsal tubercles, carina, or setae (Fig. 7A) ..... *Cirolana diminuta*

– Uropodal rami rounded distally, without notches; peduncle articles 1 and 2 of antennules not fused; coxae visible dorsally on pereonites 2–7; pleonites 3–5 with row of small tubercles on posterior margins; pleotelson of adult males with two large dorsal submedian tubercles or carinae (Fig. 7B) ..... *Cirolana harfordi*

8 Pereopods 4–7 ambulatory (dactylus shorter than propodus) ..... 9

– Pereopods 4–7 prehensile (dactylus generally as long as, or longer than propodus and strongly curved); adults parasitic on fishes ..... 19 [Cymothoidae]

9 Dorsal surface of pleon tuberculate, with small to medium tubercles present on posterior margins of at least pleonites 3–5 ..... 10

– Dorsal surface of pleon without tubercles ..... 13 [Aegidae]

10 Pleotelson dorsally setose, lateral margins with single incision ..... 11 [Corallanidae]

– Pleotelson not dorsally setose, lateral margins without incisions.... 12 [Tridentellidae]

11 Male head with 3 large horns or tubercles, including 1 rostral and 2 posterolateral between the eyes (female without tubercles); pereonites 2–7 without dorsal setae or tubercles; pleotelson subtriangular with rounded apex, dorsal surface setose except for median longitudinal area (Fig. 8A)..... *Excorallana tricornis occidentalis*

– Head of both males and females without horns or tubercles; pereonites 4–7 with dorsal setae and row of small tubercles on posterior margin; pleotelson triangular with subacute apex, entire dorsal surface densely covered with bifid golden setae (Fig. 8B) ..... *Excorallana truncata*

12 Body dorsal surface sculptured with low or small tubercles; head of male with 5 low tubercles, including 1 rostral, 1 pair near anterior margin, and 1 pair near posterior margin; male pereonite 1 with 2 small, median tubercles near anterior margin; female lacking tubercles on head and pereon; pleonites 3–5 with small tubercles on posterior margins; pleotelson minutely tuberculate dorsally with widely rounded, slightly crenulate posterior margin (Fig. 8D) ..... *Tridentella quinicornis*

– Body dorsal surface sculptured with large processes and numerous tubercles; male head with 2 dorsal posterolateral horns, frontal margin produced into large, up-turned process and smaller ventrally projecting rostrum; pereonite 1 with 3 large dorsal processes; all pereonites and pleonites with numerous dorsal tubercles that increase in size and become more spine-like posteriorly; pleotelson triangular with subtruncate apex, dorsally covered with longitudinal rows of large, spine-like tubercles; females much less spinose than males, lacking large processes on head and pereonite 1 (Fig. 8C) ..... *Tridentella glutacantha*

13 Peduncular articles 1 and 2 of antennules greatly expanded (dilated), article 2 with gradual distal process extending 25–50% the distance into article 3; posterior margin of pleotelson truncate, crenulated and fringed with setae (Fig. 8E) ..... *Aega lecontii*

– Peduncular articles of antennules not dilated, article 2 without distal process; posterior margin of pleotelson rounded or sub acuminate ..... 14

14 Eyes large, close-set, nearly touching at midline; pleotelson shield-shaped with sub acuminate apex and weekly serrated (notched) posterolateral margins; uropodal rami ovate with sub acuminate apices (Fig. 8F)<sup>Endnote 3</sup> ..... *Aegiochus plebeia*

– Eyes medium to large, but distinctly separated and not nearly touching medially; posterior margin of pleotelson rounded; uropodal rami with broadly rounded to truncate apices ..... 15

15 Medial process of uropodal peduncle very long, extending at least 75% of length of endopod ..... 16

– Medial process of uropodal peduncle extends 50% or less of length of endopod....17

16 Propodi of pereopods 1–3 with large, broad, spine-bearing medial lobe; dactyli of pereopods 1–3 longer than propodi; frontal lamina broadly expanded anteriorly, arrowhead or spatulate shaped (Fig. 9B) ..... *Rocinela belliceps*

– Propodi of pereopods 1–3 without expanded medial lobe; dactyli of pereopods 1–3 subequal in length to propodi; frontal lamina thin and narrow (Fig. 9E) ..... *Rocinela signata*

17 Medial process of uropodal peduncle extends < 40% of length of endopod; propodi of pereopods 1–3 with 4 stout, recurved acute spines; merus of pereopods 1–3 with 5–8 acute spines (3–5 distal, 2 or 3 proximal) (Fig. 9A) ..... *Rocinela angustata*

– Medial process of uropodal peduncle extends ~ 50% of length of endopod; propodi of pereopods 1–3 with 4–6 acute spines; merus of pereopods 1–3 with 4 acute spines (3 distal, 1 proximal) ..... 18

18 Propodi of pereopods 1–3 with 5 thin, straight acute spines; apical article of maxillipedal palp with thin, nearly straight, acute spines (Fig. 9C) ..... *Rocinela laticauda*

– Propodi of pereopods 1–3 with 4–6 stout and recurved acute spines; apical article of maxillipedal palp with stout, recurved acute spines (Fig. 9D) ..... *Rocinela murilloi*

19 Pleopods and uropods not setose ..... 20

– Pleopods and uropods heavily setose, adapted for swimming (juvenile cymothoids)<sup>Endnote 4</sup> ..... **unidentified Cymothoidae**

20 Body very broad and darkly pigmented; pereon at least 2× as wide as pleon with strongly convex lateral margins (widest at pereonite 5); parasite of barspot cardinalfish and Panamic fanged blenny in Eastern Pacific (Fig. 10A)<sup>Endnote 5</sup> .....

..... *Renocila thresherorum*

– Body not as above ..... 21

21 Posterior margin of head weakly to strongly trisinuate; pleon not immersed in pereon ..... 22

– Posterior margin of head not trisinuate; pleon partially immersed in pereon ..... 23

22 Head not immersed in pereonite 1, posterior border distinctly trisinuate; coxal margins of all or just posterior pereonites with acute or subacute posterolateral angles, coxae may be held close to body (*acuminata* form) or greatly expanded laterally (*aster* form); uropods visible dorsally, extending clearly beyond posterior border of pleotelson; parasite of ~ 40 different species of fishes (Fig. 10B) ..... *Nerocila acuminata*

– Head somewhat immersed in pereonite 1, subquadrate anteriorly with weakly trisinuate posterior border; uropods not visible in dorsal view, typically held concealed under pleotelson and not extending beyond posterior border; parasite of Pacific bumper, pompanos, serranos, carangids, and other fishes (Fig. 10C) ..... *Smenispa convexa*

23 Basal articles of antennules expanded and touching or nearly touching ..... 24

– Basal articles of antennules not expanded and touching ..... 25

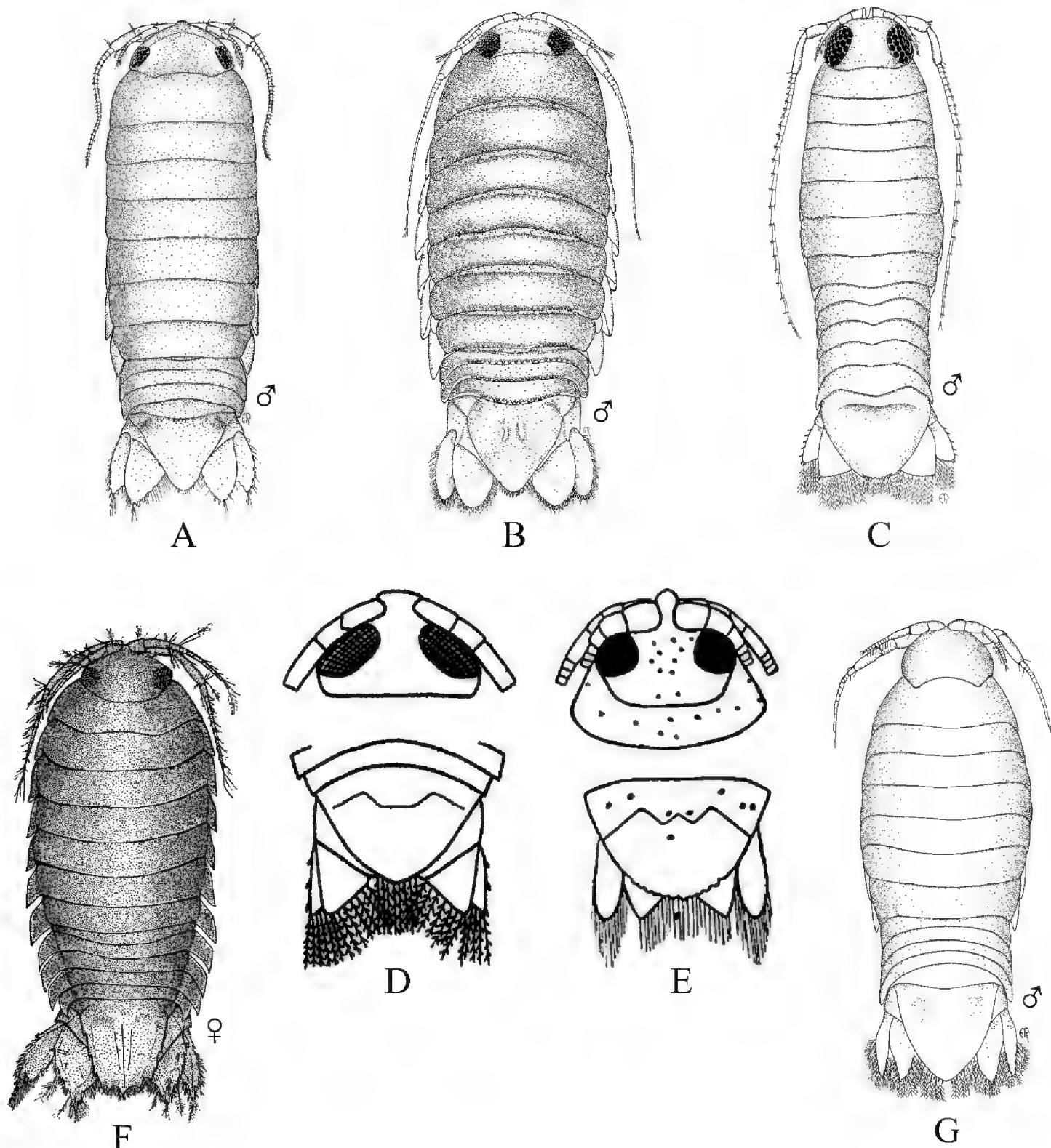
24 Pereopods 4–7 carinate; posterior margin of pleonite 5 trisinuate except in occasional males; parasite of pelagic fishes, including striped mullet off southern California and pompanos and herring off Baja California (Fig. 11A)<sup>Endnote 6</sup> .....

..... *Ceratothoa gaudichaudii*

– Pereopods 4–7 not carinate; posterior margin of pleonite 5 smooth, not trisinuate; parasite of mullets and flatfish (Fig. 11B) ..... *Ceratothoa gilberti*

25 Antennules longer than antennae; parasite of California and skipper halfbeaks (Fig. 10D) ..... *Mothocyta rosea*

– Antennules shorter than antennae ..... 26

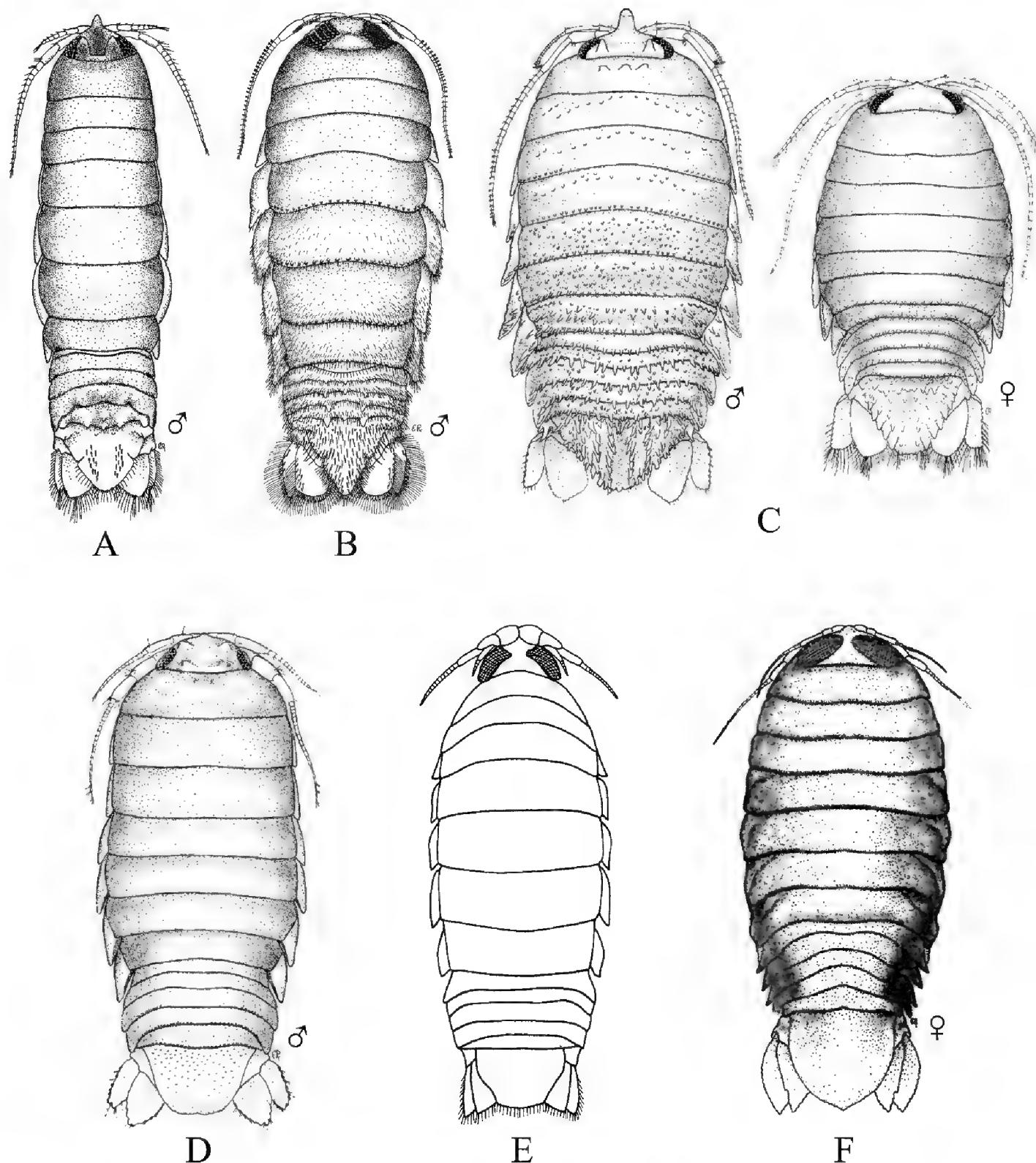


**Figure 7.** Isopoda, Cymothoida, Cymothooidea, Cirolanidae: **A** *Cirolana diminuta* (after Brusca et al. 1995) **B** *Cirolana harfordi* (after Brusca et al. 1995) **C** *Eurydice caudata* (after Brusca et al. 1995) **D** *Exciorolana chiltoni* (after Schultz 1969) **E** *Exciorolana linguifrons* (after Schultz 1969) **F** *Metacirolana joanneae* (after Schultz 1966) **G** *Natatolana californiensis* (after Brusca et al. 1995).

26 Frontal margin of head broadly rounded or truncate (not produced); bases of pereopods 4–7 with distinct carinae; coxae of pereonites 6 and 7 extending to and usually beyond posterior edge of respective pereonites; pleotelson in adult females nearly 2× as wide as long; parasite of at least 30 species of fishes (Fig. 11E) .....

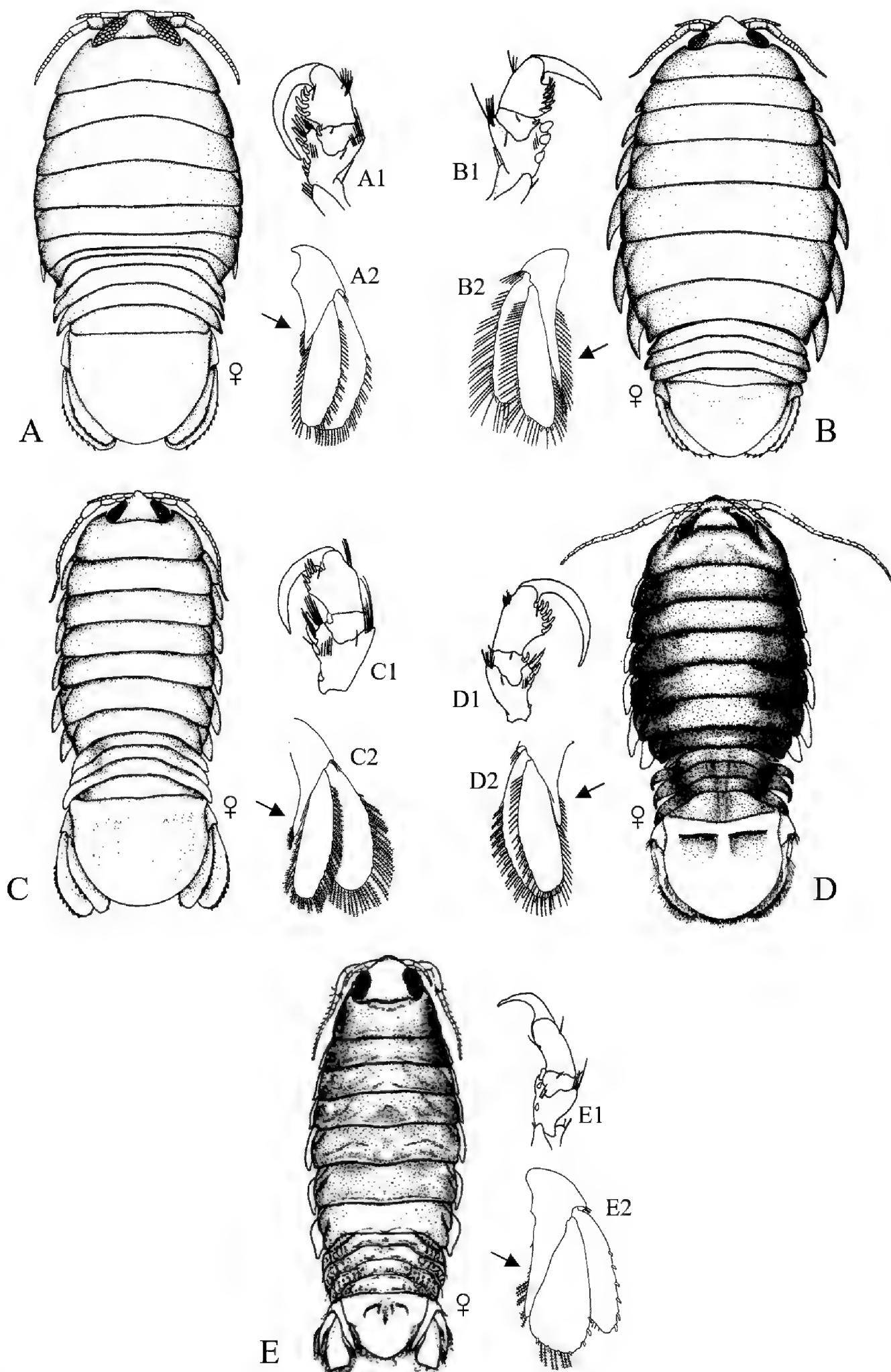
..... *Elthusa vulgaris*

– Frontal margin of head produced; bases of posterior pereopods of females without distinct carinae; coxae of pereonites 6 and 7 not reaching posterior margins of respective pereonites; pleotelson in adult females either as wide as or wider than long ..... 27

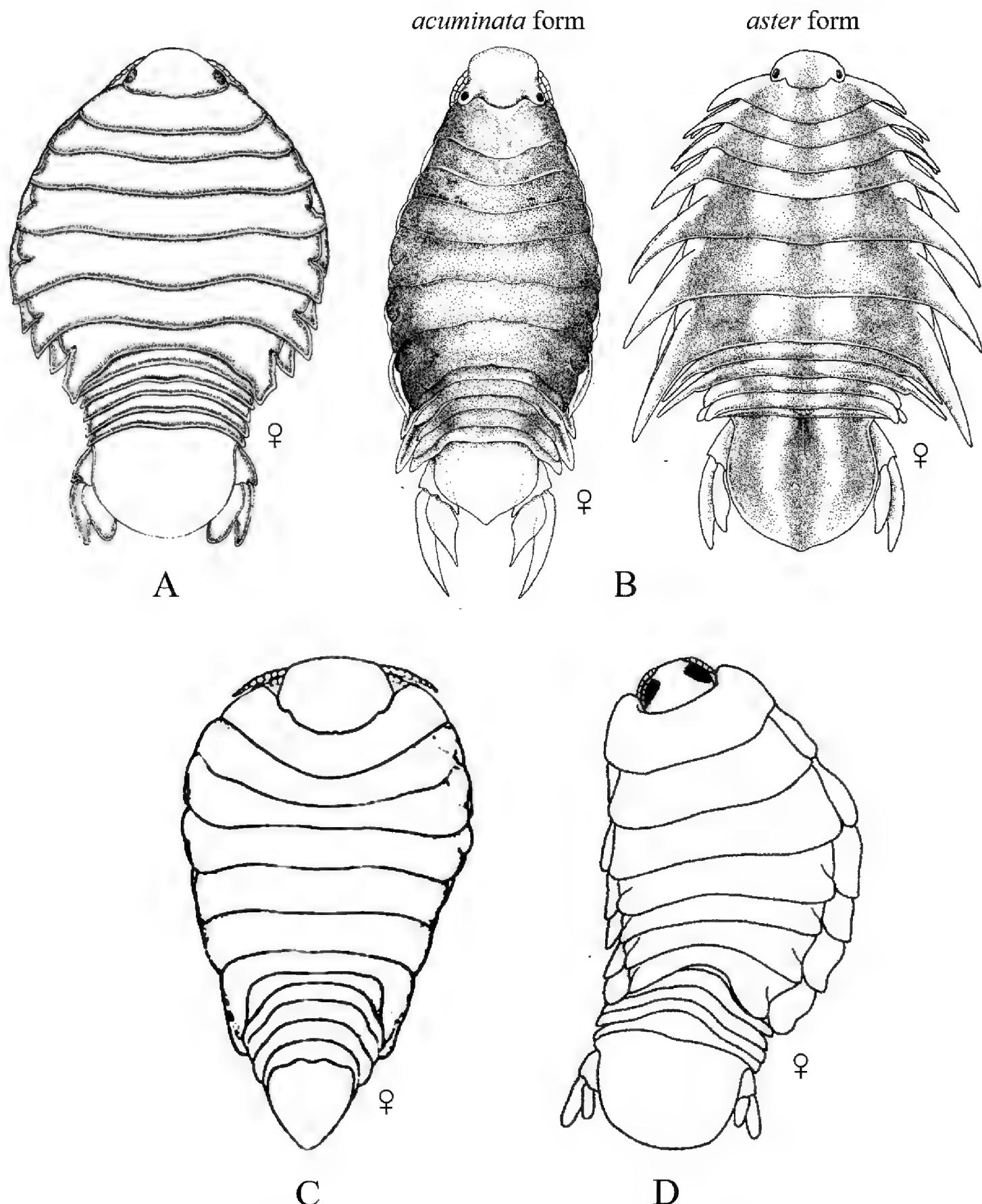


**Figure 8.** Isopoda, Cymothoida, Cymothooidea, Corallanidae: **A** *Excorallana tricornis occidentalis* (after Delaney 1984) **B** *Excorallana truncata* (after Delaney 1984). Tridentellidae: **C** *Tridentella glutacantha* (after Delaney and Brusca 1985) **D** *Tridentella quinicornis* (after Delaney and Brusca 1985). Aegidae (in part): **E** *Aega lecontii* (after Schultz 1969) **F** *Aegiochus plebeia* (after Brusca 1983a).

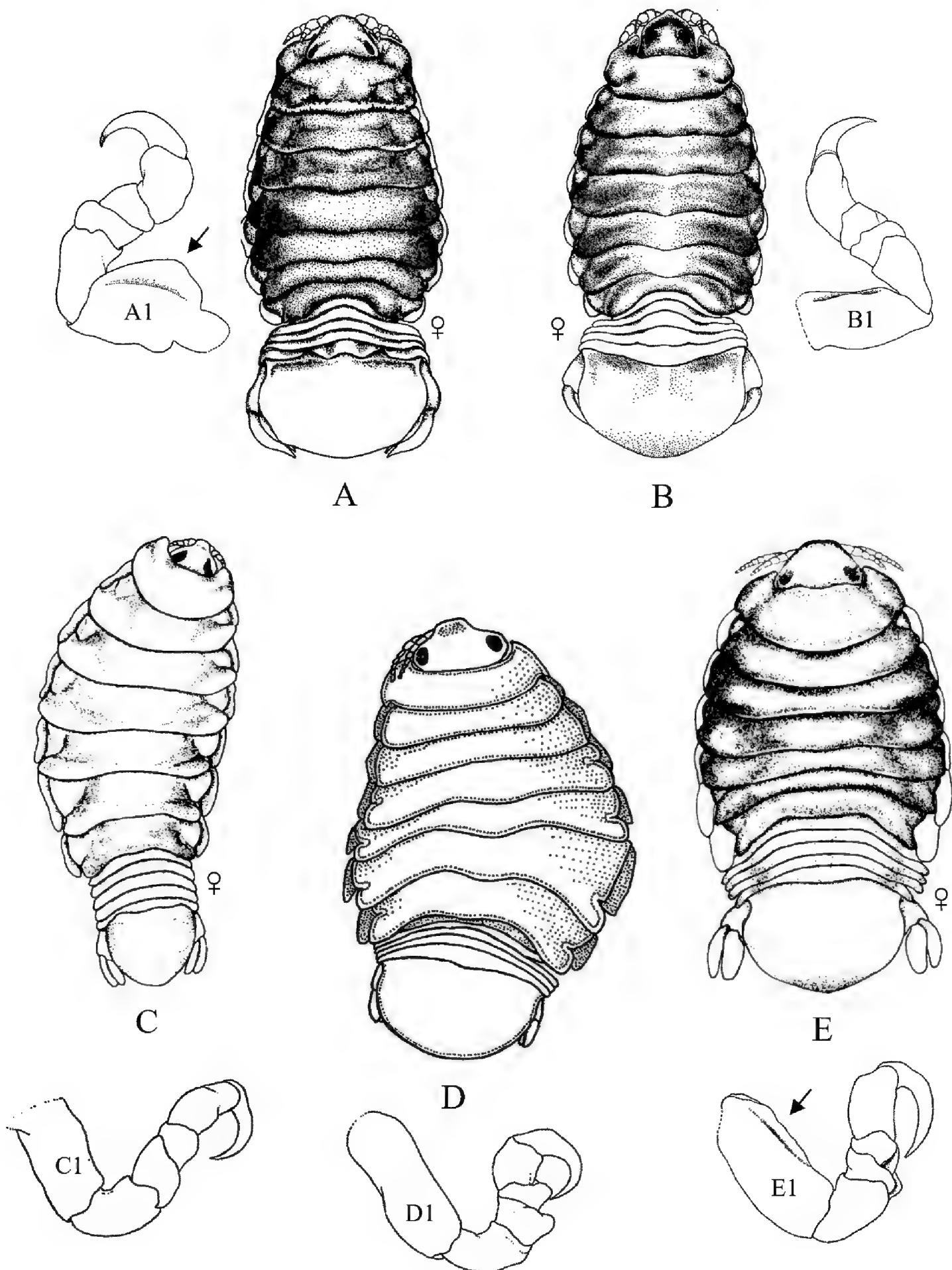
27 Merus and carpus of pereopod 4 expanded; bases of pleopods with well-developed accessory lamellae; pleotelson in adult females broadly rounded,  $\sim 1.5\text{--}2.0 \times$  wider than long; males with coxal carinae on pereopods 4–7; parasite of wooly sculpin, northern clingfish, and reef finspot (Fig. 11D)..... ***Elthusa menziesi***  
 – Merus and carpus of pereopod 4 not expanded; accessory lamellae of pleopodal bases not well developed; pleotelson in adult females ca. as wide as long; males without carinae on posterior pereopods; parasite of surfperch, smelt, gobies, killifish, and grunion (Fig. 11C) ..... ***Elthusa californica***



**Figure 9.** Isopoda, Cymothoidea, Cymothooidea, Aegidae (in part): **A** *Rocinela angustata* (after Brusca and France 1992) **B** *Rocinela belliceps* (after Brusca and France 1992) **C** *Rocinela laticauda* (after Brusca and France 1992) **D** *Rocinela murilloi* (after Brusca and Iverson 1985; Brusca and France 1992) **E** *Rocinela signata* (after Brusca and Iverson 1985; Brusca and France 1992) **A1–E1** = pereopods 3 **A2–E2** = uropods with medial process of peduncle indicated by arrows.



**Figure 10.** Isopoda, Cymothoida, Cymothooidea, Cymothoidae (in part): **A** *Renocila thresherorum* (after Brusca 1981) **B** *Nerocila acuminata* (after Brusca and Iverson 1985) **C** *Smenispa convexa* (after Brusca 1981) **D** *Mothocyia rosea* (after Brusca et al. 2007).



**Figure 11.** Isopoda, Cymothoidea, Cymothooidea, Cymothoidae (in part): **A** *Ceratothoa gaudichaudii* **A1** pereopod 4 with arrow indicating carina (after Brusca 1981) **B** *Ceratothoa gilberti* **B1** pereopod 4 (after Brusca 1981) **C** *Elthusa californica* **C1** pereopod 4 (after Brusca 1981) **D** *Elthusa menziesi* **D1** pereopod 4 (after Menzies 1962a; Brusca 1981) **E** *Elthusa vulgaris* **E1** pereopod 4 with arrow indicating carina (after Brusca 1981).

## Key D. Suborder Cymothoidea, Superfamily Cymothooidea (in part): Family Gnathiidae

Fig. 12

1 Head with enlarged forceps-like mandibles projecting anteriorly (male gnathiids) ... **2**

– Head not as above, without projecting mandibles; body often sac-like (female and juvenile gnathiids)<sup>Endnote 7</sup> ..... **Gnathiidae spp.**

2 Eyes present, with or without pigment; telson variable in shape ..... **3**

– Eyes absent; frontal margin of head (frons) with 3 central processes, laterals larger than middle process; epimeres single, dorsal, laterally projected; telson distinctly triangular (Fig. 12D) ..... **Gnathia coronadoensis**

3 Pleotelson distinctly triangular ..... **4**

– Pleotelson arrowhead or T-shaped with base expanded ..... **8**

4 Pleonal epimeres laterally expanded, highly visible; body with few to numerous setae ..... **5**

– Pleonal epimeres not laterally expanded, barely visible; body with relatively few setae ..... **7**

5 Frontal margin of head forming broad, transverse, minutely crenulated plate (best viewed ventrally); eyes brown to reddish brown; body setosity light, without numerous setae; pleopods without setae (Fig. 12A) ..... **Caecognathia crenulatifrons**

– Frontal margin of head not transverse (lobes or processes present); eyes reddish brown; body not hirsute, but with numerous setae; pleopods with setae ..... **6**

6 Body mottled with brown pigment; frontal margin of head forming centrally extended narrow lobe with crenulations; mandibles split into 2 articles<sup>Endnote 8</sup> .....  
..... **Caecognathia sp. A**

– Body without pigment; frontal margin of head trilobed with 3 central subequal processes; mandibles of single article only (not split into 2 articles) (Fig. 12G)....  
..... **Gnathia tridens**

7 Eyes dark brown, body mottled with brown pigment; frontal margin of head with 3 processes, median process largest and shaped as stepwise pyramid; head with setae and tuberculations (Fig. 12F) ..... **Gnathia steveni**

– Eyes reddish brown; body without pigmentation; frontal margin of head with central 3-dimensional expansion in shape of box, with 2 large setae extending outward centrally; head with setae, but lacking tuberculations<sup>Endnote 8</sup> ..... **Gnathia sp. MBC1**

8 Pleotelson distinctly T-shaped ..... **9**

– Pleotelson arrowhead-shaped ..... **10**

9 Eyes sessile, dark brown, lens with tuberculations; body speckled with tiny black dots; frontal margin of head produced into single large lobe; pleopods ovate, paddle-like; body hirsute (Fig. 12B) ..... **Caecognathia sanctaecrucis**

– Eyes on distinct ocular peduncles, unpigmented, lens without tuberculations; frontal margin of head with 2 medium-large lateral processes and 4 central subequal processes; pleopods long and narrow; body hirsute (Fig. 12C) ..... **Gnathia clementensis**

10 Pleonal epimeres double (dorsal and ventral); eyes golden/amber in color; frontal margin of head with 3 central, subequal processes; body with numerous scattered setae, but not hirsute (Fig. 12H) ..... ***Gnathia trilobata***

— Pleonal epimeres single (dorsal only) ..... 11

11 Eyes golden or amber in color; head with dorsal carina present; frontal margin of head as 1 broad truncate lobe with medial carina; body hirsute<sup>Endnote 8</sup> ..... ***Caecognathia* sp. SD1**

— Eyes with red and white checkerboard pattern; head without dorsal carina; frontal margin of head with 3 central subequal processes; body not hirsute, but with numerous setae (Fig. 12E) ..... ***Gnathia productatridens***

**Key E. Suborder Cymothoida, Superfamilies Bopyroidea and Cryptoniscoidea**  
Figs 13–16

1 Body of adult female distinctly segmented with clear division of head (cephalon), thoracic (pereon), and abdominal (pleon) regions ..... 2 [Bopyridae and Ionidae]

— Body of adult female sac-like, with at most weak segmentation visible ..... 18 [Dajidae and Hemioniscidae]

2 Adult female body broadly oval; pleon strongly torsioned and reflexed forward over pereon; head without eyes, deeply embedded in pereon, anterior margin covered by oostegites; plemomes 3–6 fused medially; branchial parasite of deep-water crangonid shrimps of genus *Glyphocrangon* (Fig. 13B) ..... ***Bathygyge grandis***

— Female body not as above, pleon not strongly reflexed over pereon ..... 3

3 Female pleon with pleopods and/or elongated lateral plates (epimeres or pleural lamellae) clearly noticeable in dorsal view ..... 4

— Female pleon without pleopods or elongated lateral plates noticeable in dorsal view ..... 12

4 Lateral plates of pleon and/or pleopods conspicuously elongate, foliaceous, or lanceolate, with or without digitated or crenulated margins ..... 5

— Lateral plates of pleon and pleopods relatively short, distal margins of pleopods mostly rounded ..... 10

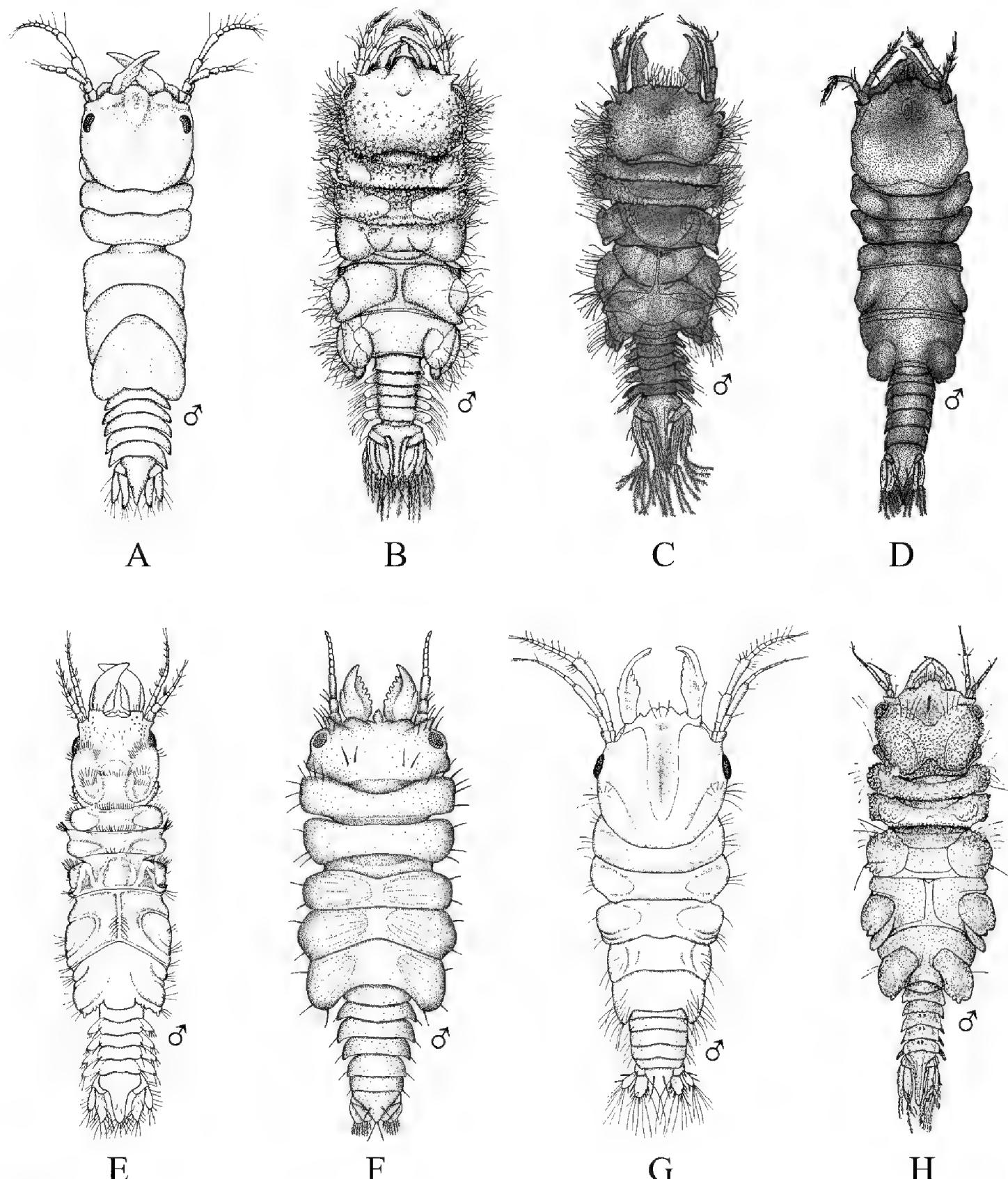
5 Adult female with elongated lateral plates fringed with long, branched processes; branchial parasite of ghost shrimps of genus *Neotrypaea* (Fig. 13A) ..... ***Ione cornuta***

— Adult female with or without lateral plates, but lateral plates not as above if present ..... 6

6 Adult female body nearly oval, with oostegites conspicuously visible dorsally arching over margins of head and pereon; head longer than wide, deeply immersed in pereon, eyes absent; pereomere 6 much longer than other pereomeres, pereomeres 1–5 concave anteriorly, pereomeres 6 and 7 concave posteriorly; pleon with “triramous appendages” in appearance, but each one consists of a foliaceous lanceolate lateral plate and identical biramous pleopod; branchial

parasite of hermit crabs *Parapagurodes laurentae* and *P. makarovi* (Fig. 13C) ....  
 ..... ***Anathelges hypthalus***

– Adult female body not as above, pereomere 6 subequal in length to other pereomeres; pleon with lateral plates and pleopods not appearing like triramous appendages..... 7



**Figure 12.** Isopoda, Cymothoidea, Cymothooidea, Gnathiidae: **A** *Caecognathia crenulatifrons* (after Wetzer and Brusca 1997) **B** *Caecognathia sanctaecrucis* (after Wetzer and Brusca 1997) **C** *Gnathia clementensis* (after Schultz 1966) **D** *Gnathia coronadoensis* (after Schultz 1966) **E** *Gnathia productatridens* (after Wetzer and Brusca 1997) **F** *Gnathia steveni* (after Menzies 1962a) **G** *Gnathia tridens* (after Wetzer and Brusca 1997) **H** *Gnathia trilobata* (after Schultz 1966).

7 Adult females with pair of dorsolateral papillae on pleomere 1; pleon with long, narrow biramous pleopods arising from thin peduncle or stem on each segment, without lateral plates; head slightly wider than long, bilobate, eyes absent; abdominal parasite of mud shrimps of genus *Upogebia* (Fig. 13F) ..... ***Phyllodurus abdominalis***

— Adult females without dorsolateral papillae on pleomere 1; pleomeres with both elongated lateral plates and pleopods, but morphology of pleopods not as above ..... 8

8 Pleon of adult females enclosed by tentacular-like, elongated lanceolate lateral plates and pleopodal exopods, each with deeply digitate margins, ventral surface covered partially by smaller foliate pleopodal endopods with crenulated margins; head completely embedded in pereon, dorsal surface divided into two large suboval lobes, eyes absent; branchial parasite of grapsid crab *Pachygrapsus crassipes* (Fig. 13D) ..... ***Leidya infelix***

— Pleon of adult females with lateral plates and pleopods not as above; head not bilobate ..... 9

9 Adult female body ~ 2 × longer than wide, pyriform in shape; head slightly wider than long, eyes absent; coxal plates very large, overlapping, and extending well beyond lateral margins of pereomeres; pleon obscured by prominent ovate lateral plates and long, biramous lanceolate pleopods; branchial parasite of pelagic galatheid “red crab” *Pleuroncodes planipes* (Fig. 13E) ..... ***Munidion pleuroncodis***

— Adult female body slightly longer than wide; head subcircular, eyes absent; coxal plates prominent but not widely extended on pereomeres 1–4; lateral edges on convex side of pereomeres 5–7 produced into slender points reflexed back over dorsum; pleomeres 1–5 with dentate-margined lanceolate lateral plates and similar biramous pleopods; branchial parasite of hermit crab *Isocheles pilosus* (Fig. 14D) ..... ***Asymmetrione ambodistorta***

10 Adult female head somewhat bilobate, eyes absent; pereomeres 1–6 with sharply pointed tergal projections on longer side of body; pleomeres 1–5 with short lateral plates and distally rounded uniramous pleopods; branchial parasite of several genera of crangonid and hippolytid shrimps (e.g., *Crangon*, *Eualus*) (Fig. 14A) ...  
..... ***Argeia pugettensis***

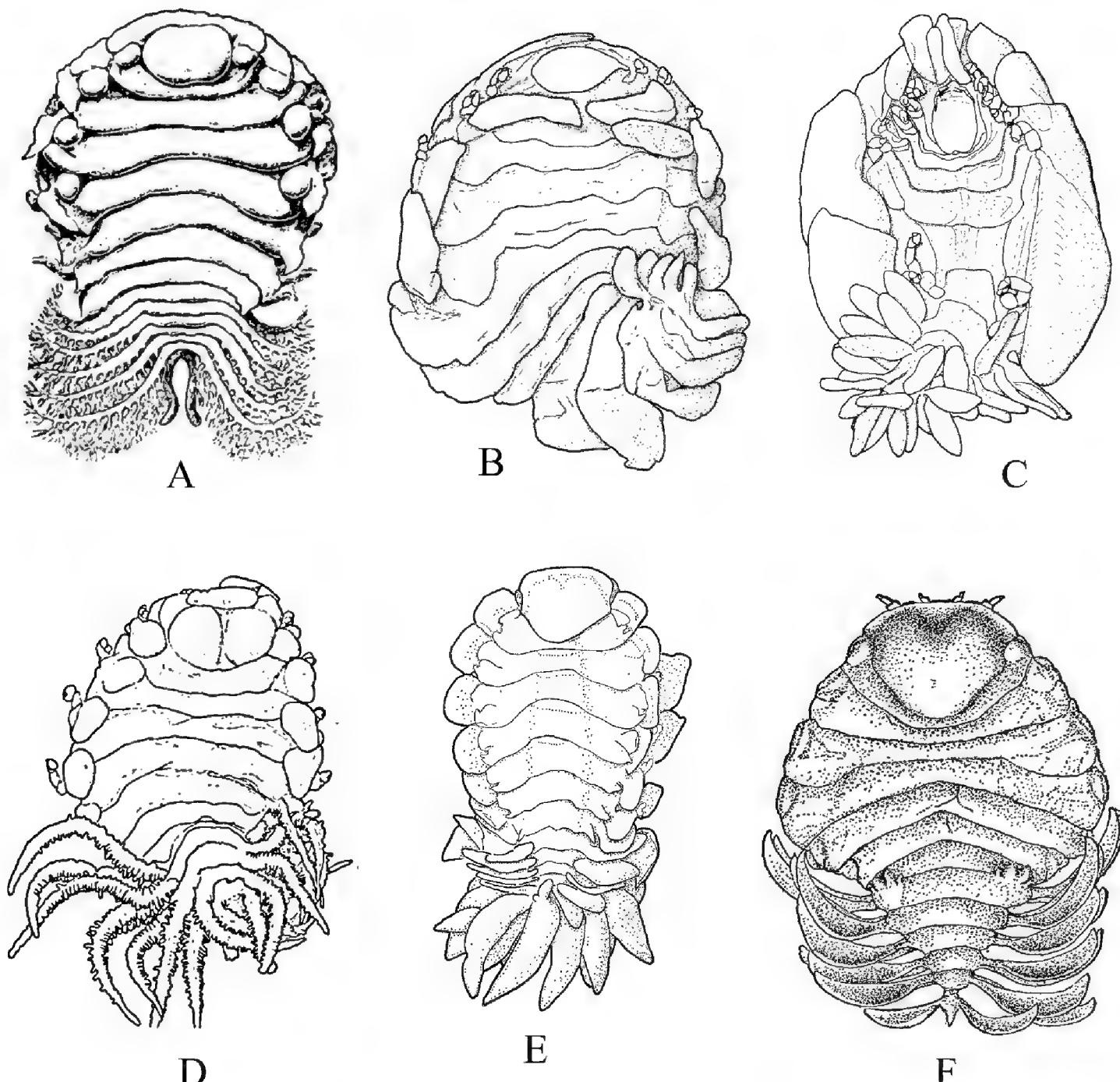
— Adult females not as above; head not bilobate, with or without eyes; pereon without sharp tergal projections; pleopods biramous ..... 11

11 Adult female head wider than long with rounded anterior and posterior margins, eyes absent; narrow and rudimentary coxal plates on pereomeres 3 and 4 on both sides of body; branchial parasite of porcelain crab *Pachycheles pubescens* (Fig. 14C) ..... ***Aporobopyrus oviformis***

— Adult female head subtriangular in shape, anterolateral margins produced into small obtuse projections, eyes present; rudimentary coxal plates of pereomeres 3 and 4 only on longer side of body; branchial parasite of porcelain crabs *Pachycheles* spp. (Fig. 14B) ..... ***Aporobopyrus muguensis***

12 Adult female body oval to broadly oval, pereon and pleon subequal in width; branchial parasite of mud shrimps of genus *Upogebia* ..... 13

— Adult female body not oval, pleon tapering to much narrower than widest pereomeres ..... 14



**Figure 13.** Isopoda, Cymothoida, Epicaridea, Bopyroidea, Ionidae: **A** *Ione cornuta* (after Richardson 1905a). Bopyridae (in part): **B** *Bathygyge grandis* (after Markham 2016) **C** *Anathelges hyphalus* (after Markham 1974a) **D** *Leidya infelix* (after Markham 2002) **E** *Munidion pleuroncodis* (after Markham 1975); **F** *Phyllodurus abdominalis* (after Richardson 1905a).

13 Adult female body broadly oval, almost as wide as long (L:W ratio ~ 1.2); head almost square, deeply embedded in pereomere 1, eyes absent; ventral surface of pleomeres covered by overlapping lanceolate lateral plates and uniramous uropods, middle region covered by similar sized biramous pleopods (Fig. 14E) .....

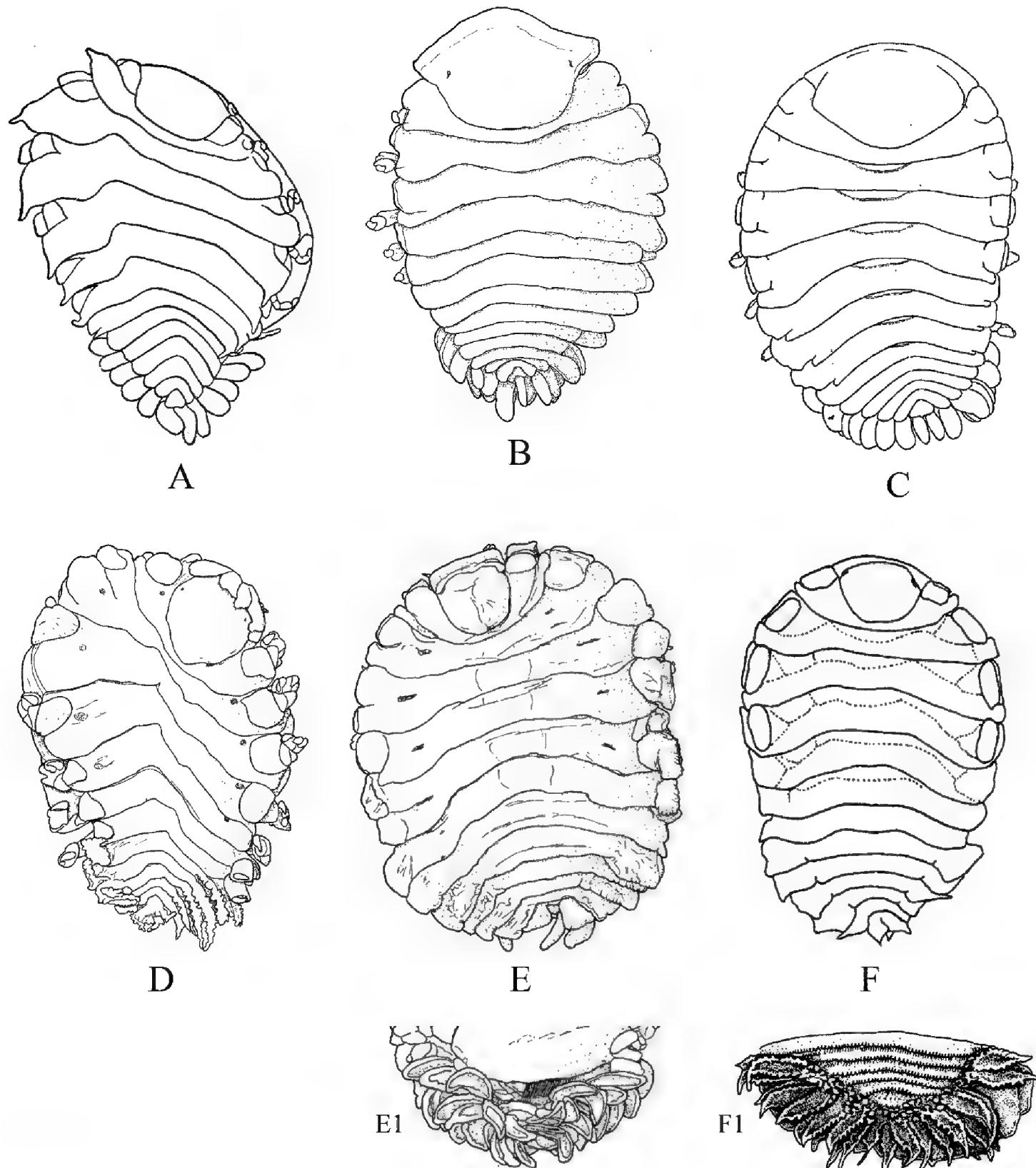
..... *Orthione griffenis*

– Adult female body oval, distinctly longer than wide (L:W ratio ~ 1.5); head slightly wider anteriorly than posteriorly, deeply embedded in pereomere 1, eyes present; ventral surface of pleomeres covered by numerous ridges and lanceolate biramous, marginally tuberculate pleopods (Fig. 14F) .....

..... *Progebiophilus bruscai*

14 Pleon of adult females composed of 5 medially fused pleomeres and pleotelson, the latter deeply arcuate and embedded in pleomere 5; head roughly triangular, separated from pereon by deep groove, eyes absent; branchial parasite of hippolytid shrimps *Hippolyte californiensis* and *Thor algicola* (Fig. 15E) ..... ***Schizobopyrina striata***

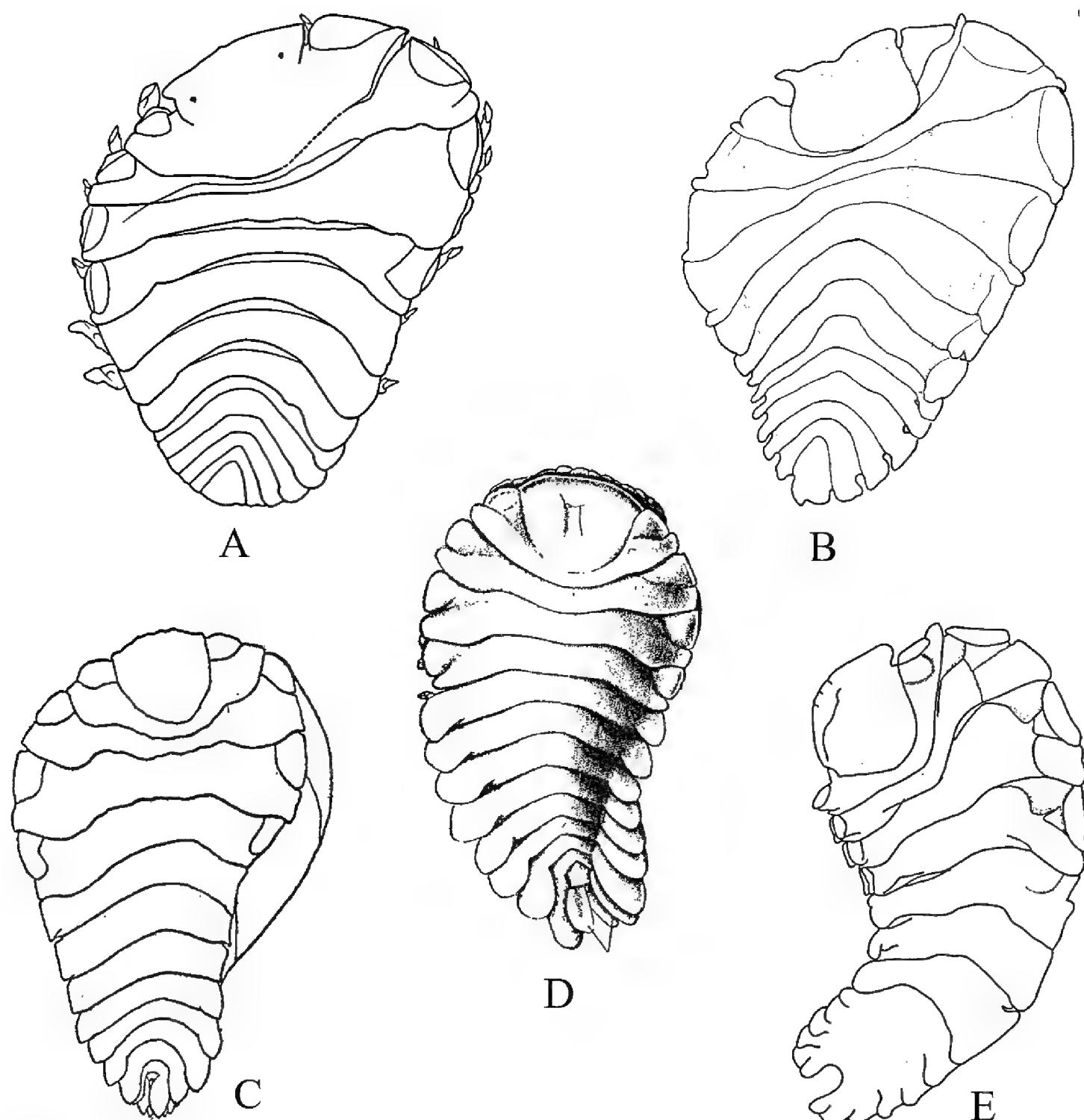
— Adult female body not as above; pleomeres distinctly separate, not medially fused; head with or without eyes ..... 15



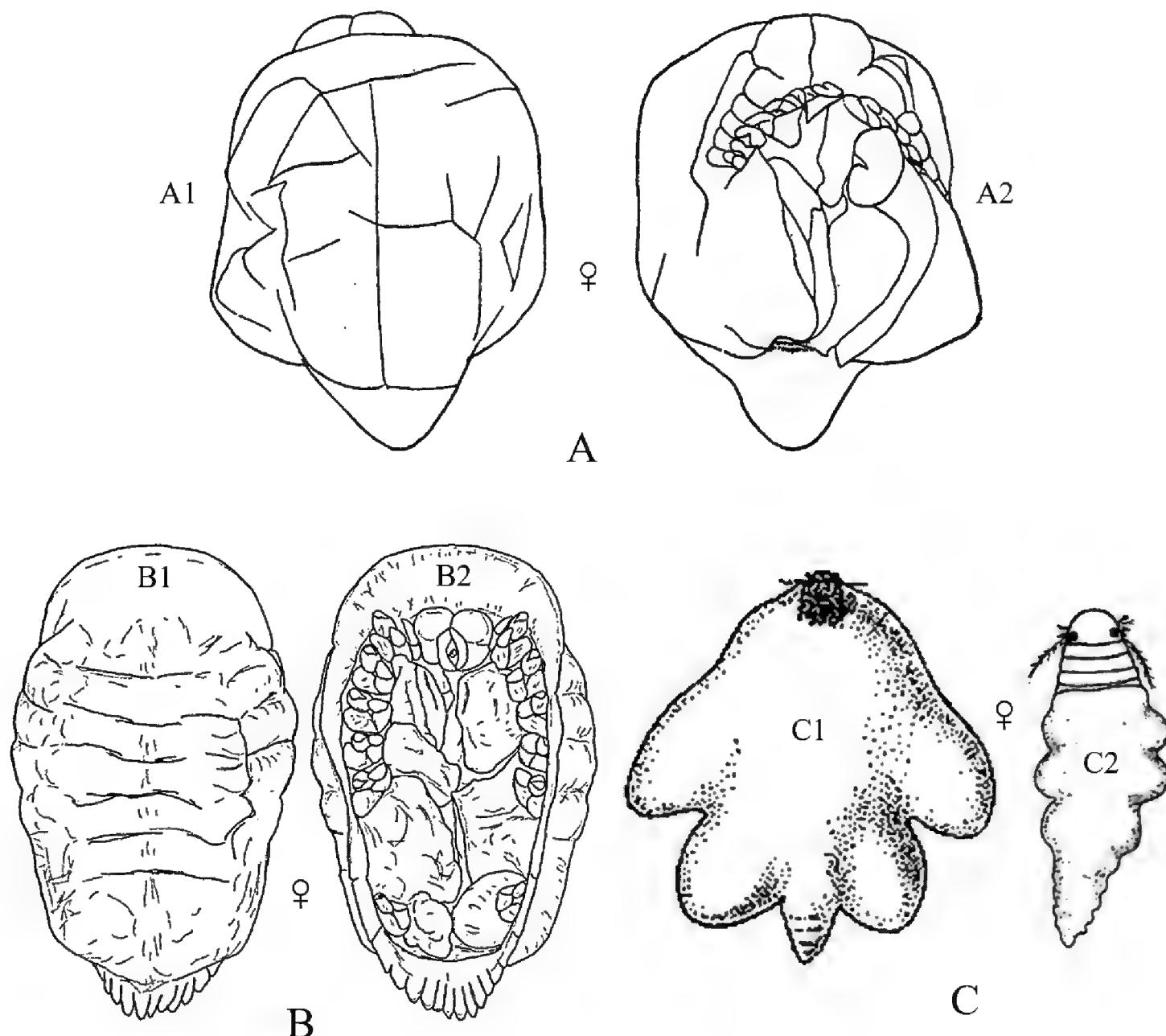
**Figure 14.** Isopoda, Cymothoida, Epicaridea, Bopyroidea, Bopyridae (in part): **A** *Argeia pugettensis* (after Richardson 1905a) **B** *Aporobopyrus muguensis* (after Markham 2008) **C** *Aporobopyrus oviformis* (after Shiino 1934) **D** *Asymmetrione ambodistorta* (after Markham 1985b) **E** *Orthione griffenis* **E1** ventral view of pleon and pleopods (after Markham 2004) **F** *Progebiophilus bruscai* **F1** ventral view of pleon and pleopods (after Campos and de Campos 1998).

15 Head of adult female partially fused with pereomere 1 and separated by only short lateral notches; frontal margin of head slightly sinuated with anterolateral process usually on just short side of body, small eyes present; pleotelson entirely set within curves of pleomere 5; branchial parasite of snapping shrimps *Alpheopsis equidactylus* and *Synalpheus lockingtoni* (Fig. 15A).....  
 ..... *Bopyrella calmani*

– Female head distinctly separate and not fused with pereomere 1, eyes absent; pleotelson not completely set within curves of pleomere 5 ..... 16



**Figure 15.** Isopoda, Cymothoida, Epicaridea, Bopyroidea, Bopyridae (in part): **A** *Bopyrella calmani* (after Sassaman et al. 1984) **B** *Capitetragonia alphei* (Caribbean species = representative for *Capitetragonia* sp. A; after Markham 1985a) **C** *Eremitione giardi* (after Richardson 1905a) **D** *Pseudione galacanthae* (after Richardson 1905a) **E** *Schizobopyrina striata* (after Campos and de Campos 1990).



**Figure 16.** Isopoda, Cymothoida, Epicaridea, Cryptoniscoidea, Dajidae: **A** *Holophryxus alaskensis* (adult female) **A1** dorsal view **A2** ventral view (after Richardson 1905b) **B** *Zonophryxus probisowa* (adult female) **B1** dorsal view **B2** ventral view (Peruvian species = representative for unidentified SCB species of *Zonophryxus*; after Boyko and Williams 2021a). Hemioniscidae: **C** *Hemioniscus balani* **C1** adult female **C2** juvenile female (after Nierstrasz and Brender à Brandis 1926; Williams and Boyko 2012).

16 Head of adult female squarish with distinct anterolateral horns and a small anteromedial indentation; pleon with 6 distinct pleomeres separated by deep lateral notches; pleopods 1–4 biramous (5<sup>th</sup> pair absent), uropods absent; branchial parasite of alpheid shrimp *Automate* sp. A (Fig. 15B)<sup>Endnote 9</sup> ..... ***Capitetragonia* sp. A**

– Female head wider anteriorly than posteriorly, without anterolateral horns; pleon with 5 pleomeres not separated by deep notches and very small 6<sup>th</sup> segment, 5 pairs of biramous pleopods, and terminal pair of lanceolate uropods ..... 17

17 Endopods of pleopods 1–5 much larger than exopods, elongate and pointed, surface rough with irregular rugae; coxal plates of pereomeres 5–7 not developed as lamellae; branchial parasite of hermit crabs of genus *Pagurus* (Fig. 15C)<sup>Endnote 10</sup> ..... ***Eremitione giardi***

– Endopods of pleopods 1–5 only slightly larger than exopods, triangular or ovate, surface smooth; coxal plates of pereomeres 5–7 developed as lamellae; branchial

parasite of squat lobsters *Galacantha diomedae* and *Munida quadrispina* in the East Pacific (Fig. 15D) ..... *Pseudione galacanthae*

18 Adult female body simply an egg sac, without evidence of segmentation; antennae and mouthparts absent; parasite on barnacles of genera *Balanus* and *Chthamalus* (Fig. 16C) ..... *Hemioniscus balani* [Hemioniscidae]

— Adult female body with weak evidence of segmentation visible dorsally or laterally; antennae and mouthparts present; parasitic on caridean shrimp of families Pasiphaeidae and Pandalidae ..... 19 [Dajidae]

19 Adult female body typically elongate and symmetrical, but may be irregular with deeper, stouter body in some specimens; head separate, typically hemispherical, visible dorsally or ventrally; segmentation of pereon usually visible laterally by 4 coxal plates; pleonal region posteriorly projected as unsegmented conical prominence; parasite on carapace of pasiphaeid shrimp *Pasiphaea pacifica* (Fig. 16A)<sup>Endnote 11</sup> ..... *Holophryxus alaskensis*

— Adult female body ovate, all regions fused and indistinct dorsally; posterior margin of pleon appears notched with row of triangularly shaped processes; parasite on carapace of pandalid shrimps *Pantomus affinis* and *Plesionika trispinus* (Fig. 16B)<sup>Endnote 12</sup> ..... *Zonophryxus* sp.

#### Key F. Suborder Limnoriidea, Superfamily Limnorioidea: Family Limnoriidae

Fig. 17

1 Dorsal surface of pleotelson without symmetrically arranged tubercles; left mandible without rasp or file-like ridges; burrowing in algal holdfasts (Fig. 17A) .....  
..... *Limnoria algarum*

— Dorsal surface of pleotelson with 3 or 4 symmetrically arranged anterior tubercles; left mandible with rasp or file-like ridges (see Fig. 17B); burrowing in wood ..... 2

2 Dorsal surface of pleotelson with 3 anterior tubercles arranged in triangle; lateral and posterior margins of pleotelson tuberculate (Fig. 17C) .....  
..... *Limnoria tripunctata*

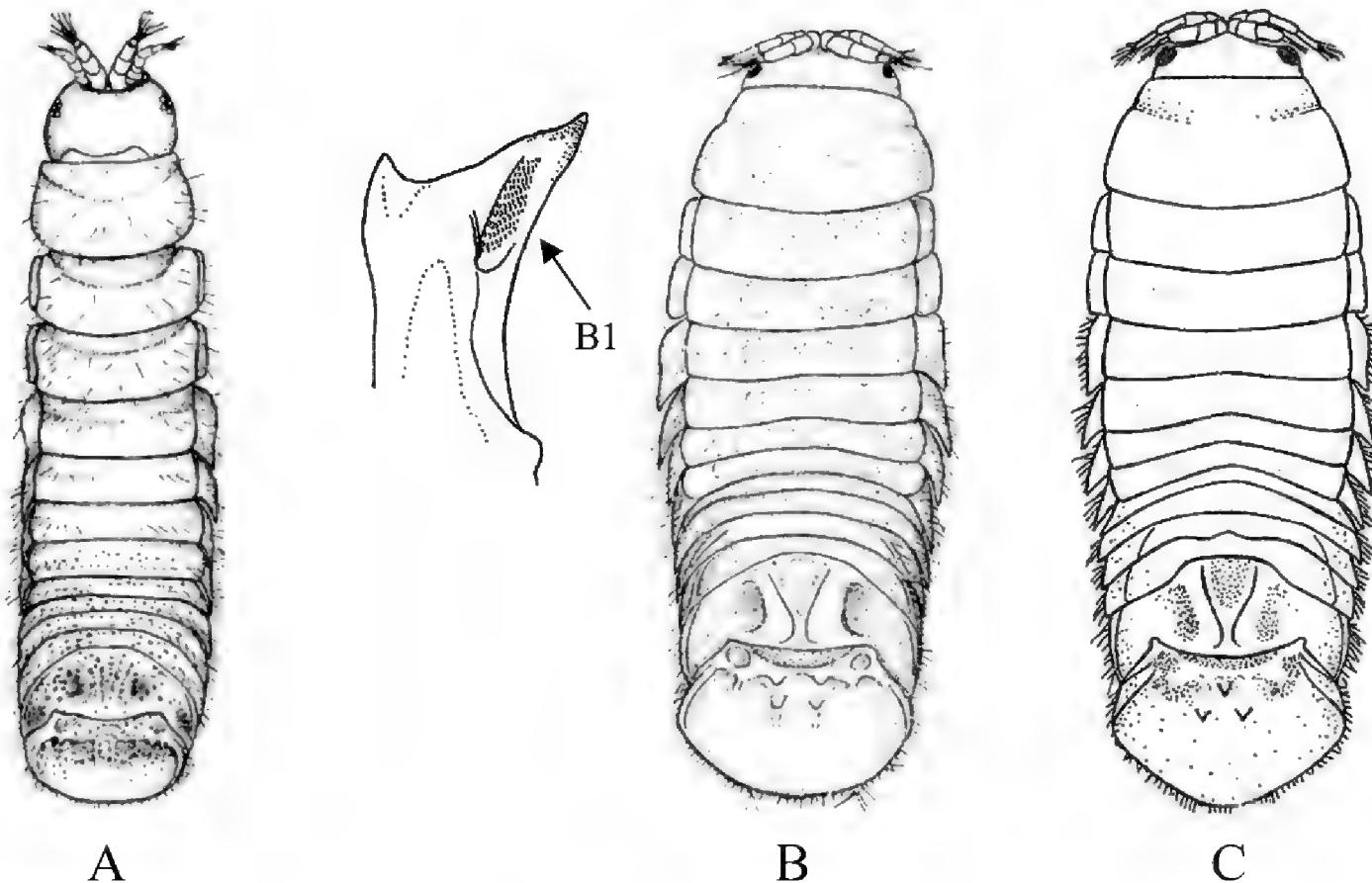
— Dorsal surface of pleotelson with 2 pairs of anterior tubercles; margins of pleotelson not tuberculate (Fig. 17B) ..... *Limnoria quadripunctata*

#### Key G. Suborder Sphaeromatidea, Superfamilies Seroloidea and Sphaeromatoidea

Figs 18–23

1 Pleon composed of 3 free pleonites plus pleotelson; body broad, depressed and platter-like; dorsum with distinct medial carinae (Fig. 18A)<sup>Endnote 13</sup> .....  
..... *Heteroserolis carinata* [Serolidae]

— Pleon composed of 1 or 2 dorsally visible free pleonites plus pleotelson ..... 2



**Figure 17.** Isopoda, Limnoriidea, Limnorioidea, Limnoriidae: **A** *Limnoria algarum* (after Menzies 1957) **B** *Limnoria quadripunctata* **B1** inner surface of left mandible showing “rasp” (after Menzies 1957) **C** *Limnoria tripunctata* (after Allen 1976).

2 Pereopod 1 subchelate in both sexes, with broadly expanded propodus and prehensile dactylus (propodus at least  $5 \times$  wider than dactylus); pereopod 2 prehensile only in males..... **3**

– Pereopod 1 ambulatory or only weakly prehensile, propodus narrow (propodus  $< 2 \times$  as wide as dactylus) ..... **6** [Sphaeromatidae]

3 Head medially fused to pereonite 1; pleopod 5 with both rami lacking transverse pleats or folds; uropods uniramous, lacking exopods ..... **4** [Ancindae]

– Head and pereonite 1 not fused; both rami of pleopod 5 with transverse pleats or folds; uropods biramous, exopods slender and spine-like; first segment of pleon with 3 suture lines (fused pleonites 1–4) and 2 small triangular processes on posterior margin; pleotelson with rounded posterior border (Fig. 18B) .....

..... **Tecticeps convexus** [Tecticipitidae]

4 Lateral margins of head strongly produced; pleon with 2 short posterior projections overhanging anterior margin of pleotelson; pleopod 1 biramous; uropodal ramus narrow proximally, then expands at least twofold for ~ 80% of length before tapering to acute point (Fig. 19C) ..... **Bathycopea daltonae**

– Lateral margins of head weakly produced; pleon without posterior projections; pleopod 1 uniramous; uropodal ramus styliform, widest proximally and tapering to an acute point ..... **5**

5 Body broad (L:W ratio ~ 1.7) with densely granulated surfaces; pereonite 1 narrower than pereonites 2–7; pleotelson inflated, distinctly wider than long with

truncate apex; eyes slightly elevated on swellings; uropods strongly recurved distally (Fig. 19A)<sup>Endnote 14</sup> ..... *Ancinus granulatus*

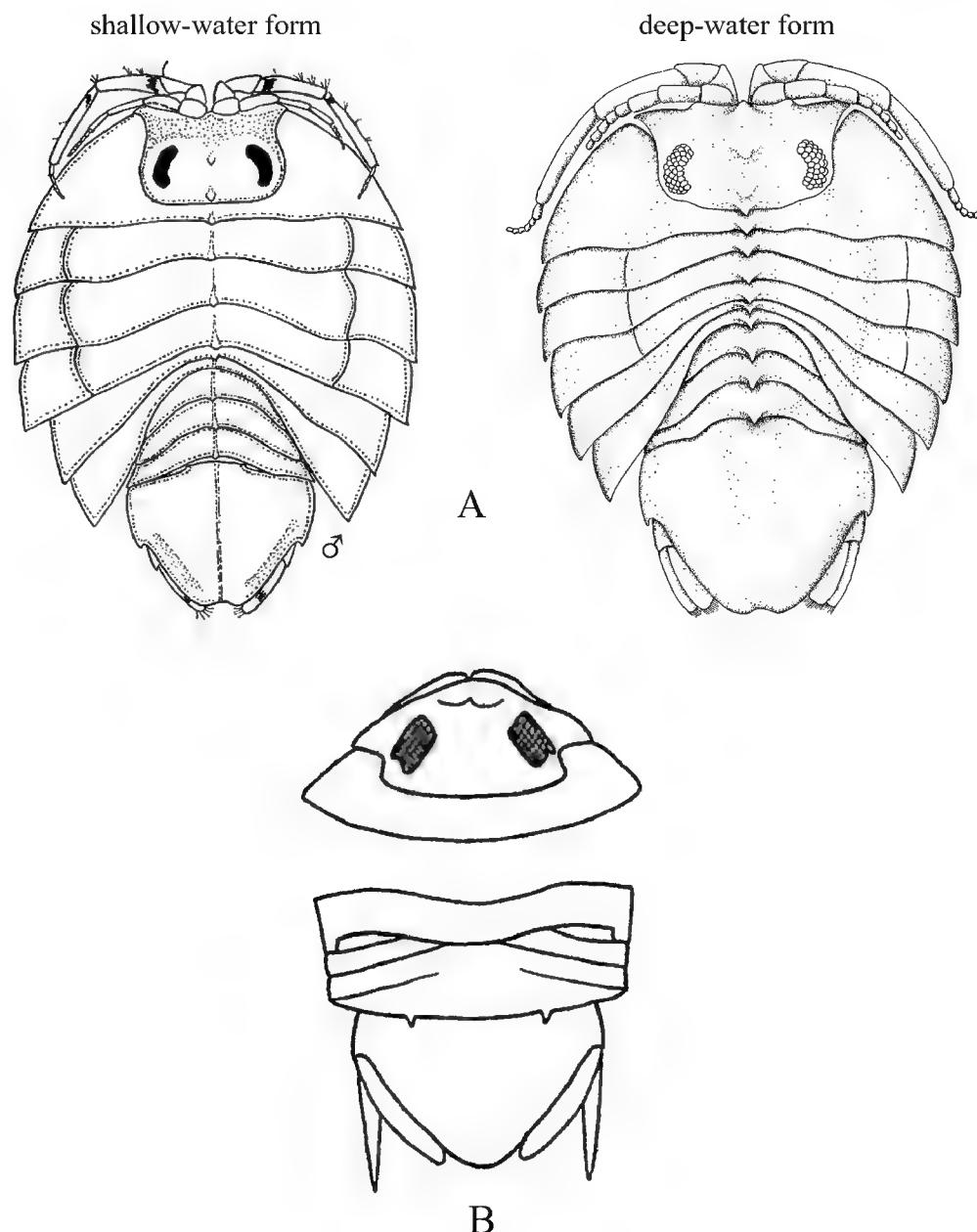
– Body relatively narrow (L:W ratio  $> 2.0$ ) with smooth surfaces; pereonite 1 wider than pereonites 2–7; pleotelson not inflated, longer than wide with nearly acute or narrowly rounded apex; eyes not elevated; distal tips of uropods only slightly recurved (Fig. 19B)<sup>Endnote 14</sup> ..... *Ancinus seticomvus*

6 Endopods of pleopods 4 and 5 without branchial pleats or folds ..... 7

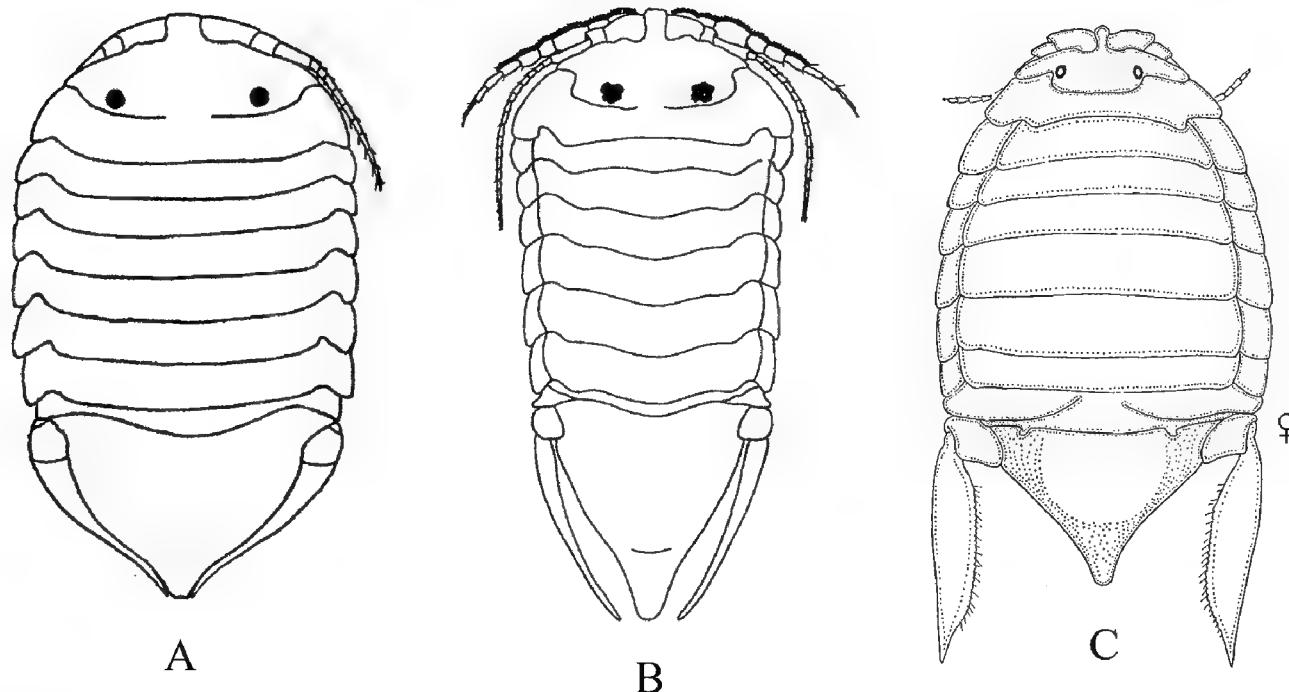
– Endopods of pleopods 4 and 5 with branchial pleats or folds ..... 8

7 In lateral view, anterior margins of coxal plates of pereonites 2–4 appear raised and posterior margins not raised, giving the coxae a somewhat S-shaped appearance; species is fully marine (Fig. 20B)<sup>Endnote 15</sup> ..... *Gnorimosphaeroma oregonense*

– In lateral view, anterior margins of coxal plates 2–4 are not raised, and coxae do not appear S-shaped; species occurs in brackish or freshwater habitats (Fig. 20A) ..... *Gnorimosphaeroma noblei*



**Figure 18.** Isopoda, Sphaeromatidea, Seroloidea, Serolidae: **A** *Heteroserolis carinata* (shallow-water form after Menzies and Barnard 1959; deep-water form after Wetzer and Brusca 1997). Tecticipitidae: **B** *Tecticeps convexus* (after Richardson 1905a; Schultz 1969).

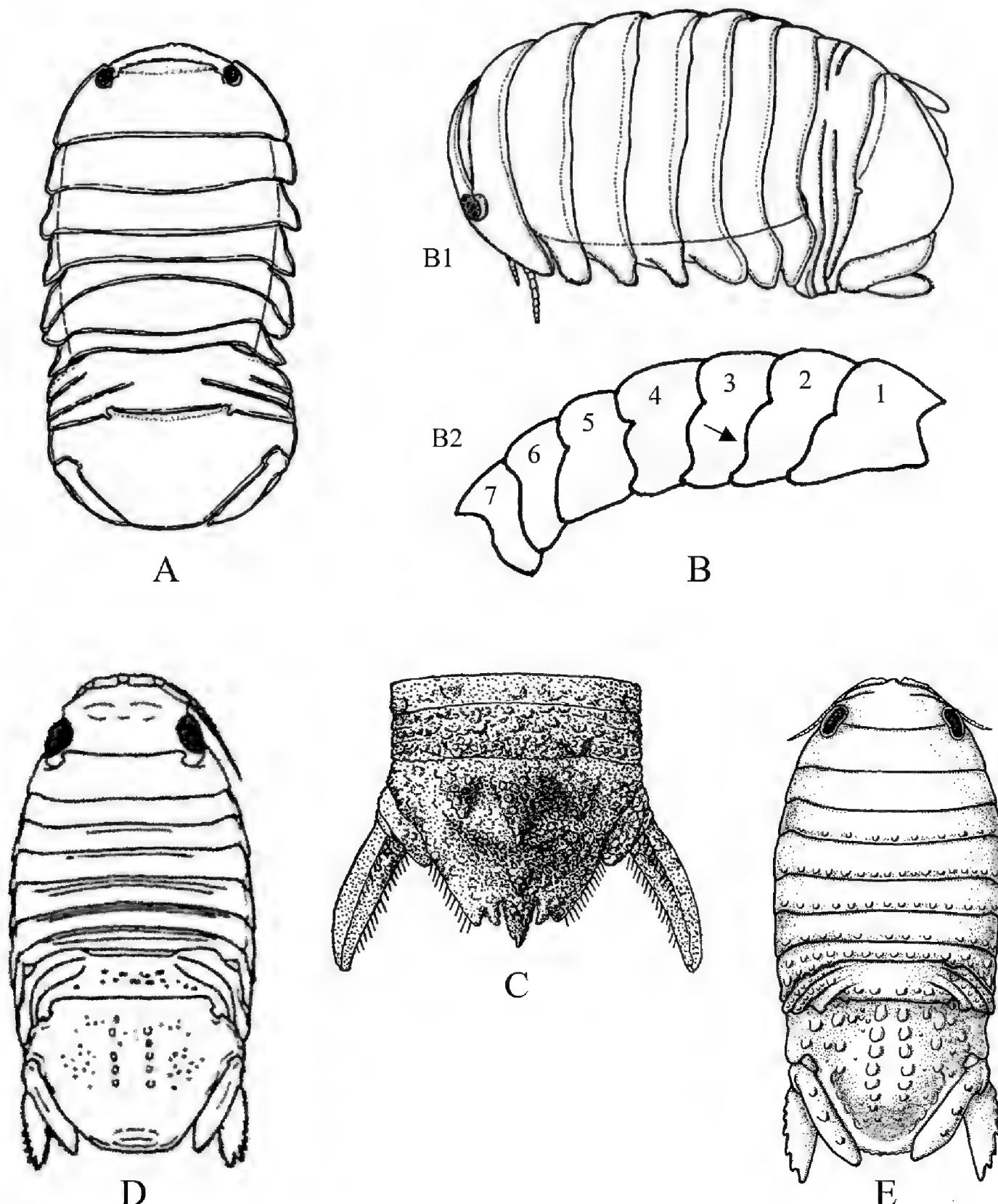


**Figure 19.** Isopoda, Sphaeromatidea, Sphaeromatoidea, Ancinidae: **A** *Ancinus granulatus* (after Holmes and Gay 1909) **B** *Ancinus seticomvus* (after Iverson 1982) **C** *Bathycopea daltonae* (after Menzies and Barnard 1959).

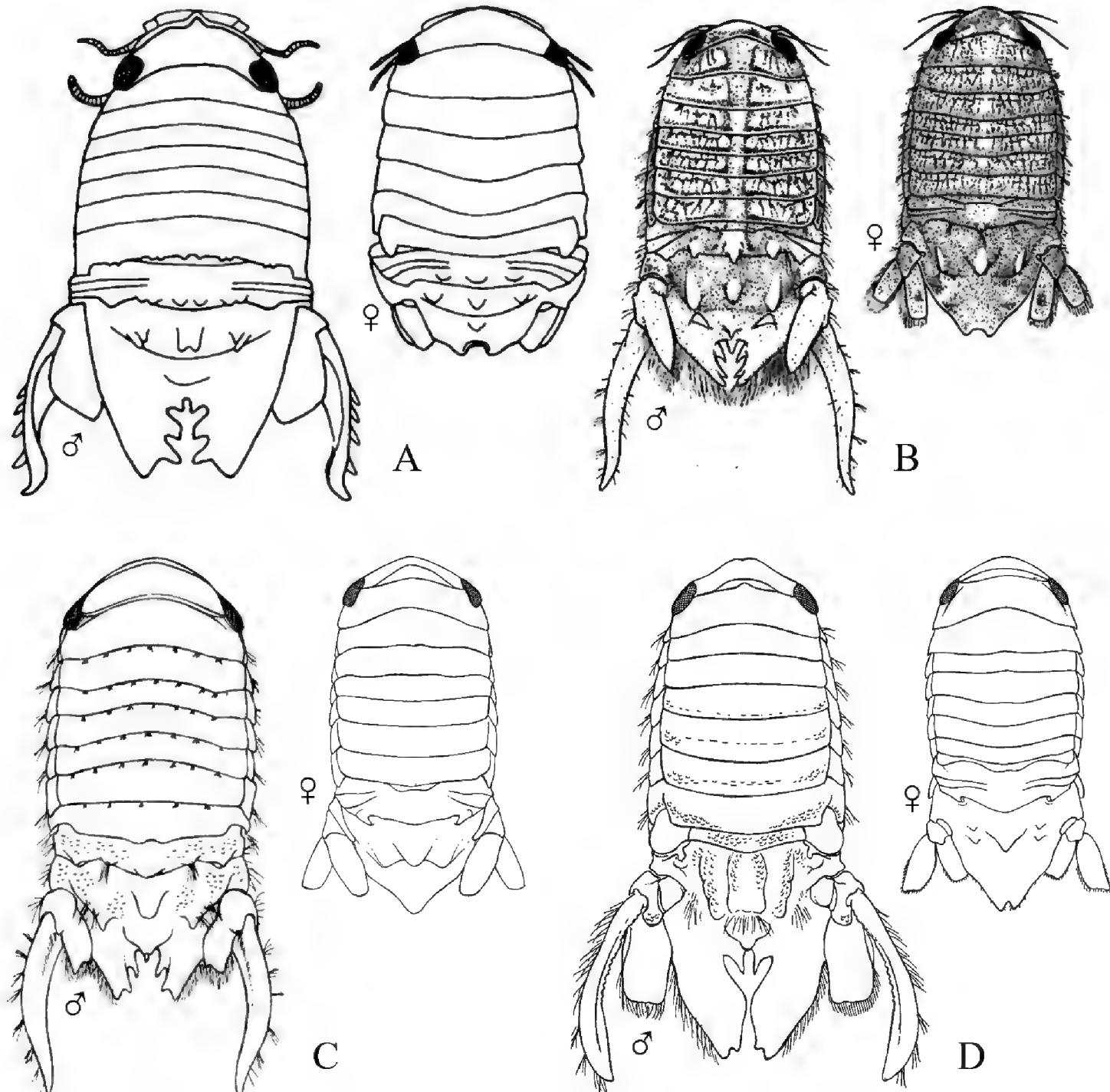
- 8 Pleopods 4 and 5 with branchial pleats on both rami ..... 9
- Pleopods 4 and 5 with branchial pleats only on endopods ..... 19
- 9 Uropods of male highly modified, each composed of elongated, cylindrical, or flattened exopod and very short endopod fused to the protopod; both uropodal rami lamellar in females; ovigerous females with 4 pairs of oostegites on pereonites 1–4 ..... 10
- Uropods lamellar in both sexes; ovigerous females with 3 pairs, 1 pair, or no pairs of oostegites ..... 14
- 10 Pleotelson of males with pronounced posteromedial tooth that completely fills apical notch and extends posteriorly beyond level of notch opening; dorsum of pleotelson with 3 transverse elevations at base, median elevation terminating in a spine; body surface densely granulated; sexual dimorphism pronounced with female body smooth, lacking ornamentation or setae (Fig. 20C) ..... *Discerceis granulosa*
- Pleotelson of males with highly complex and open apical notch, internal lateral margins of notch with various numbers of teeth forming sinuses of different shapes; body surface not densely granulated; sexual dimorphism pronounced, females without complex pleotelsonic notch, terminal notch either very short and simple or absent; dorsum of pleotelson sculptured with various types of tubercles ..... 11
- 11 Uropods of male with ventrolateral spines on exopods; female pleotelson stout, with 4 dorsal tubercles and wide, but shallow apical notch (Fig. 21A) ..... *Paracerceis cordata*
- Uropods of male without spines; female pleotelson not as above ..... 12
- 12 Pleotelson of males long, subequal in length to pereon, with complex medial sinus formed by 2 pairs of teeth, pleotelsonic sinus expanded basally into round foramen overhung by basal knob bearing tall acute spine (spine length  $\geq 4 \times$  diameter), sinus then narrowing distally to long thin channel; female pleotelson with small distal

notch and 5 dorsal tubercles (1 large medial, 4 smaller lateral); female uropodal exopods with sharply toothed posteromedial margins (Fig. 21D) ..... ***Paracerceis* sp. A**

– Pleotelson of males relatively short, ca. half length of pereon; pleotelsonic sinus not as above, without round basal foramen, with or without short spine overhanging base of notch; female uropodal exopods without sharply toothed margins ..... **13**



**Figure 20.** Isopoda, Sphaeromatidea, Sphaeromatoidea, Sphaeromatidae (in part): **A** *Gnorimosphaeroma noblei* (after Menzies 1954) **B** *Gnorimosphaeroma oregonense* **B1** dorsal view (after Menzies 1954) **B2** lateral view of pereonites 1–7 showing S-shaped coxae of anterior pereonites (e.g., arrow) **C** *Discerceis granulosa* (after Richardson 1899, 1905a) **D** *Sphaeroma quoianum* (after Harrison and Holdich 1984) **E** *Sphaeroma walkeri* (after Kensley and Schotte 1989).



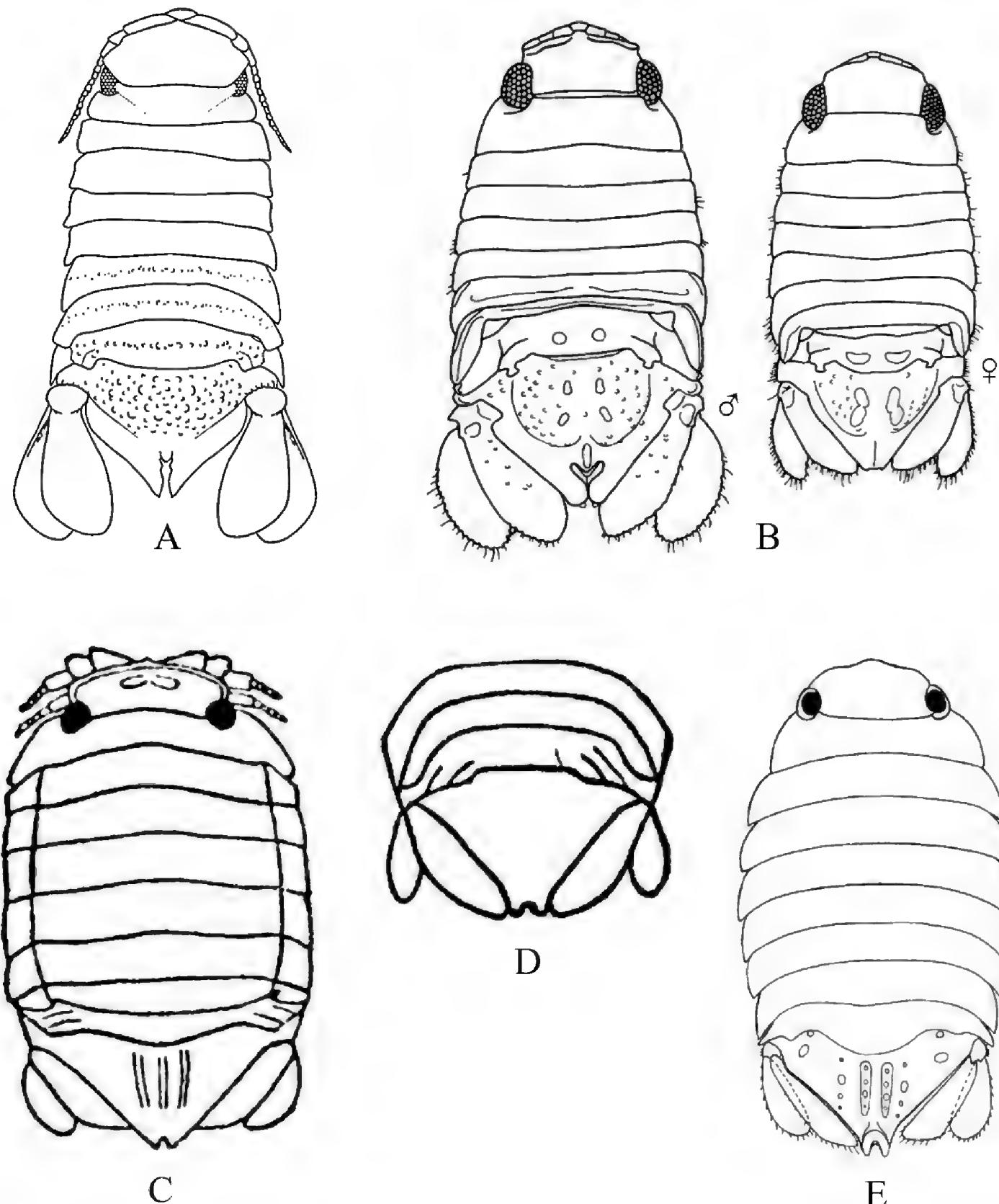
**Figure 21.** Isopoda, Sphaeromatidae, Sphaeromatoidea, Sphaeromatidae (in part): **A** *Paracerceis cordata* (after Schultz 1969) **B** *Paracerceis gilliana* (after Allen 1976) **C** *Paracerceis sculpta* (after Brusca 1980) **D** *Paracerceis* sp. A (after Brusca 1980).

13 Male pleotelson with short acute spine (i.e., length subequal to diameter) on basal knob overhanging sinus, interior margins of sinus with 2 pairs of lateral teeth; pleotelson of female elongate, acuminate posteriorly, with 3 dorsal tubercles (Fig. 21C)<sup>Endnote 16</sup> ..... *Paracerceis sculpta*  
 – Male pleotelson with large dorsal tubercle at base of sinus, interior margins of sinus with 3 pairs of sharp teeth; female pleotelson not as above (Fig. 21B) ..... *Paracerceis gilliana*  
 ..... *Pseudosphaeroma* sp.

14 Pleotelson apex entire, upturned; dorsal surface of pleotelson with 2 pairs of prominent tubercles and numerous scattered small tubercles; female sculpturing less pronounced than males (see Bruce and Wetzer 2008: fig. 1) ..... *Pseudosphaeroma* sp.  
 – Pleotelson without upturned apex, sculpturing not as above ..... 15

15 Pleotelson of males with deeply slit apical notch or expanded foramen, notch may be reduced to small depression or dorsally visible slit in females; uropodal rami subequal in length, typically extending beyond posterior margin of pleotelson; ovigerous females with 1 or 3 pairs of oostegites.....16

— Pleotelson of males and females with shallow terminal notch; uropodal exopod shorter than endopod, rami not extending beyond posterior border of pleotelson; ovigerous females without oostegites .....17



**Figure 22.** Isopoda, Sphaeromatidea, Sphaeromatoidea, Sphaeromatidae (in part): **A** *Dynoides elegans* (after Wetzer and Mowery 2017) **B** *Paradella dianae* (after Harrison and Holdich 1982) **C** *Dynamenella dilatata* (after Richardson 1899, 1905a) **D** *Dynamenella glabra* (after Richardson 1899, 1905a) **E** *Dynamenella sheareri* (after Brusca et al. 2007).

16 Pleotelsonic sinus (foramen) distinctly heart shaped with median point in males, but greatly reduced in females; dorsum of pleon with 2 rounded submedian tubercles just lateral to midline on pleonite 5, and 4 similarly spaced tubercles on pleotelson; uropodal rami with crenulated margins (at least in males) (Fig. 22B) ..... *Paradella dianae*

– Pleotelsonic sinus long and narrow, with prominent rounded tubercle barely overhanging anterior base, sinus walls straight sided and finely crenulate; dorsal surface of pleotelson covered with small tubercles; uropodal rami without crenulated margins (Fig. 22A) ..... *Dynoides elegans*

17 Frontal margin of head produced as a quadrangular process; antennular articles 1 and 2 dilated; dorsal surface of pleotelson sculptured with 3 longitudinal ridges (Fig. 22C)<sup>Endnote 17</sup> ..... *Dynamenella dilatata*

– Frontal margin of head not produced; antennular articles not dilated; dorsal surface of pleotelson smooth or tuberculate ..... 18

18 Dorsal surface of pleotelson with many tubercles (Fig. 22E) ... *Dynamenella sheareri*

– Dorsal surface of pleotelson smooth, without tubercles or ridges (Fig. 22D)<sup>Endnote 17</sup> ..... *Dynamenella glabra*

19 Uropodal exopods with distinctly serrated outer margins ..... 20

– Uropodal exopods with smooth or lightly crenulated outer margins ..... 21

20 Dorsal surface of pleotelson lightly sculptured with 2 longitudinal rows of small tubercles, posterior margin with prominent transverse elevation (Fig. 20D) ..... *Sphaeroma quoianum*

– Dorsal surface of pleotelson heavily sculptured with many longitudinal rows of small to large heavy tubercles, posterior margin without prominent transverse elevation (Fig. 20E) ..... *Sphaeroma walkeri*

21 Dorsal surface of pereonites, pleonites and pleotelson smooth, without tubercles or other ornamentation; apex of pleotelson rounded and truncate (Fig. 23C)<sup>Endnote 18</sup> ..... *Exosphaeroma inornata*

– Dorsal surface of body with ornamentation; apex of pleotelson acuminate<sup>Endnote 18</sup> ..... 22

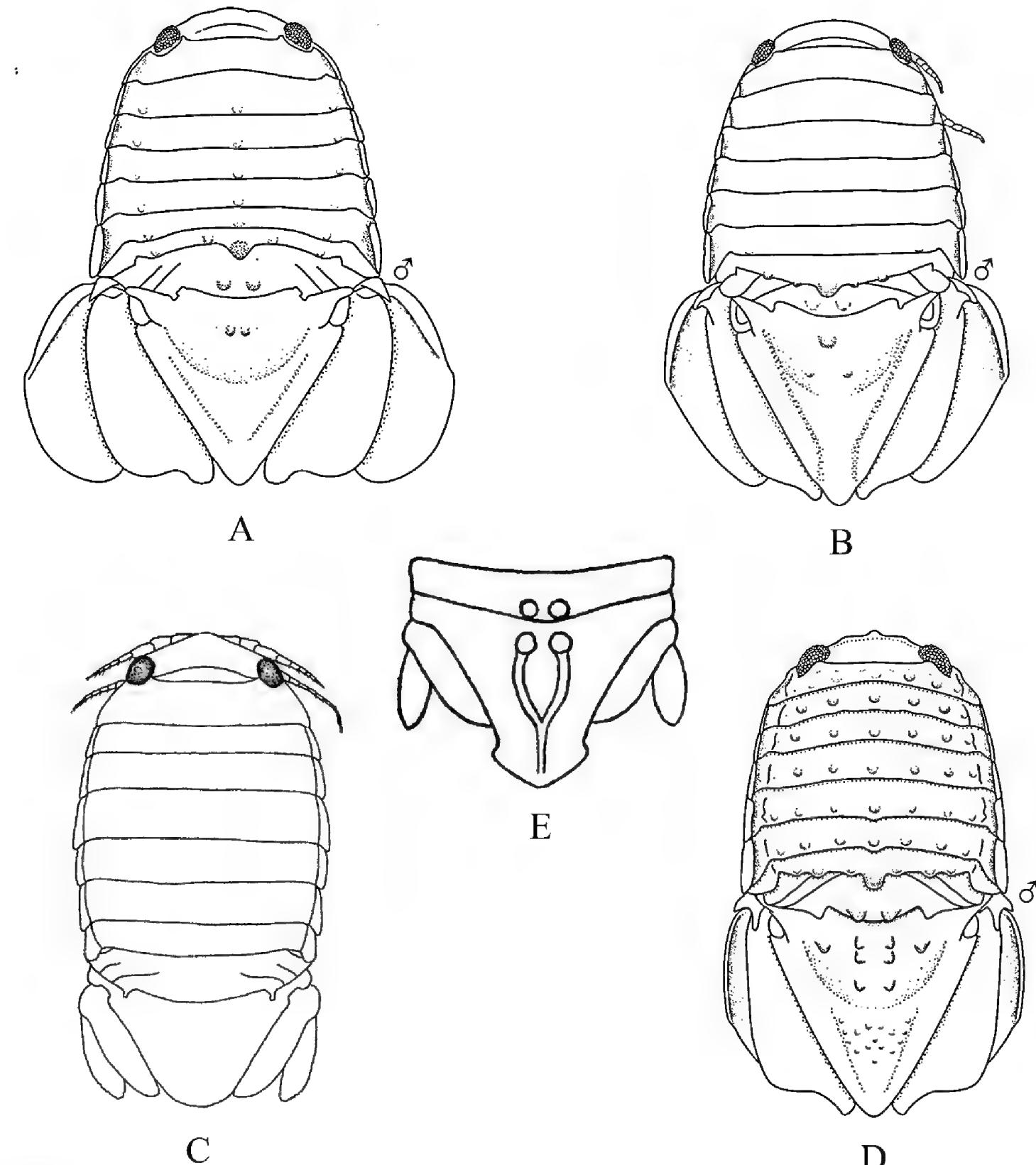
22 Pleotelson with produced rhomboid-shaped apical process and concave lateral margins, sides folded inward, forming kind of funnel-like opening when viewed ventrally; dorsum of pleotelson sculptured with 2 basal tubercles, which are continuous with 2 longitudinal ridges that converge posteriorly into a single median ridge; uropods distinctly shorter than pleotelson (Fig. 23E)<sup>Endnote 19</sup> ..... *Exosphaeroma rhomburum*

– Pleotelson triangular, dorsum without parallel ridges; uropods subequal in length to pleotelson ..... 23

23 Dorsal sculpturing subtle, starting on pereonites 6 and 7; pereonite 6 with row of 7 weak tubercles along posterior margin; pereonite 7 with posteriorly directed median process and weak lateral tubercle on each side along posterior margin; pleon with 2 medium tubercles, 1 on each side of midline; pleotelson

with 1 strong anteromedial tubercle and 2 weak tubercles lateral to midline (Fig. 23B) ..... *Exosphaeroma aphrodita*

– Dorsal sculpturing distinct on most or all pereonites, comprising either low, weak tubercles or taller, more pronounced tubercles ..... 24



**Figure 23.** Isopoda, Sphaeromatidea, Sphaeromatoidea, Sphaeromatidae (in part): **A** *Exosphaeroma amplexicauda* (after Wall et al. 2015) **B** *Exosphaeroma aphrodita* (after Wall et al. 2015) **C** *Exosphaeroma inornata* (after Iverson 1982) **D** *Exosphaeroma pentcheffi* (after Wall et al. 2015) **E** *Exosphaeroma rhomburum* (after Richardson 1899, 1905a).

24 Dorsal surface of pereonites with low, weak tubercles along posterior margins; pereonite 1 with 1 very weak median tubercle; pereonites 2–4 with 3 tubercles, 1 median and 2 laterals (1 per side); pereonites 5 and 6 with row of 7 tubercles, 1 at midline and 3 laterals per side; pereonite 7 with weak median process and paired lateral tubercles; pleotelson with 2 small anterior tubercles (Fig. 23A) ..... *Exosphaeroma amplicauda*

– Dorsal surface of all pereonites sculptured with heavy, strong tubercles giving body appearance of 7 prominent longitudinal rows of tubercles; pereonite 1 with 2 transverse rows of tubercles; pereonites 2–7 each with 1 transverse row of 7 tubercles; pereonite 7 with strong median process and 3 lateral tubercles per side; pleotelson with 3 strong medial tubercles on either side of midline, plus numerous smaller tubercles scattered over dorsal surface (Fig. 23D) ..... *Exosphaeroma pentcheffi*

### Key H. Suborder Valvifera

Figs 24–30

1 Eyes absent; head, pereonites and pleonites with transverse rows of submedian, sublateral and lateral tubercles bearing bead-like spheres; pleotelson with short oblique lateral tubercles; maxillipedal palp 4-segmented (Figs 24B, 25D) ..... *Califarcturus tannerensis* [Thermoarcturidae]

– Eyes present; body not as above ..... 2

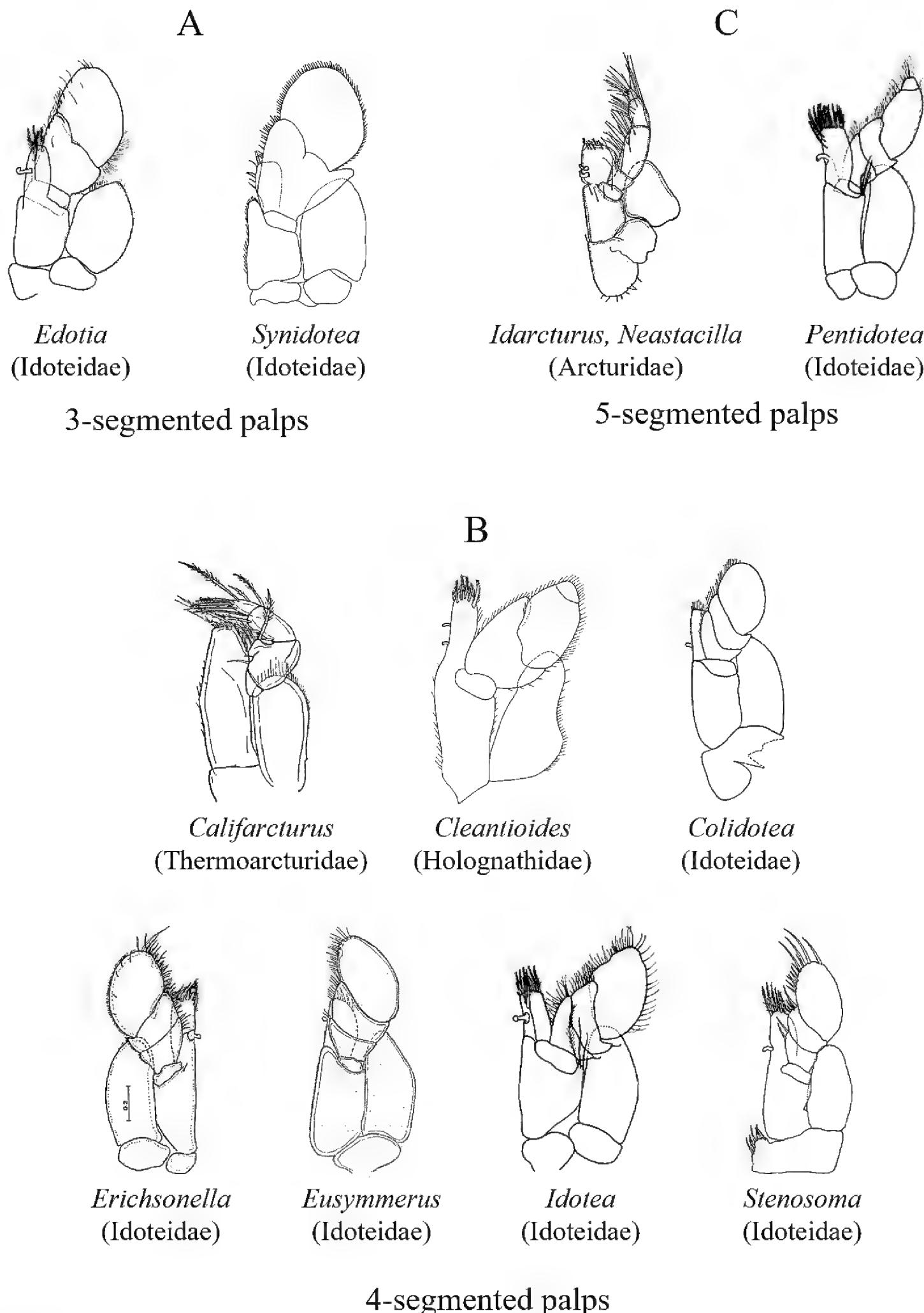
2 Head fused with pereonite 1; pereonite 4 much longer ( $> 2 \times$ ) than other pereonites; pereonite 4 much broader anteriorly than posteriorly in females; pereopods 1–4 slender, fringed with setae, directed anteriorly against ventral body wall (modified for filter feeding); pereopods 5–7 stout, prehensile; maxillipedal palp 5-segmented (Figs 24C, 25A–C) ..... 3 [Arcturidae]

– Head distinct from pereonite 1; length of pereonite 4 subequal to other pereonites; anterior pereopods not modified for filter feeding, mostly ambulatory and similar in size ..... 6

3 Head incompletely fused with pereonite 1, indicated by distinct lateral incision posterior and ventral to eye (must be viewed laterally); flagellum of antennae with ventral blade-like setae; dorsum of pereonite 4 smooth in males or with medial, bilobed swelling or tubercle in females; dorsum of other pereonites mostly smooth; pleon composed of 3 segments, including 2 pleonites plus the pleotelson (Fig. 25C) ..... *Neastacilla californica*

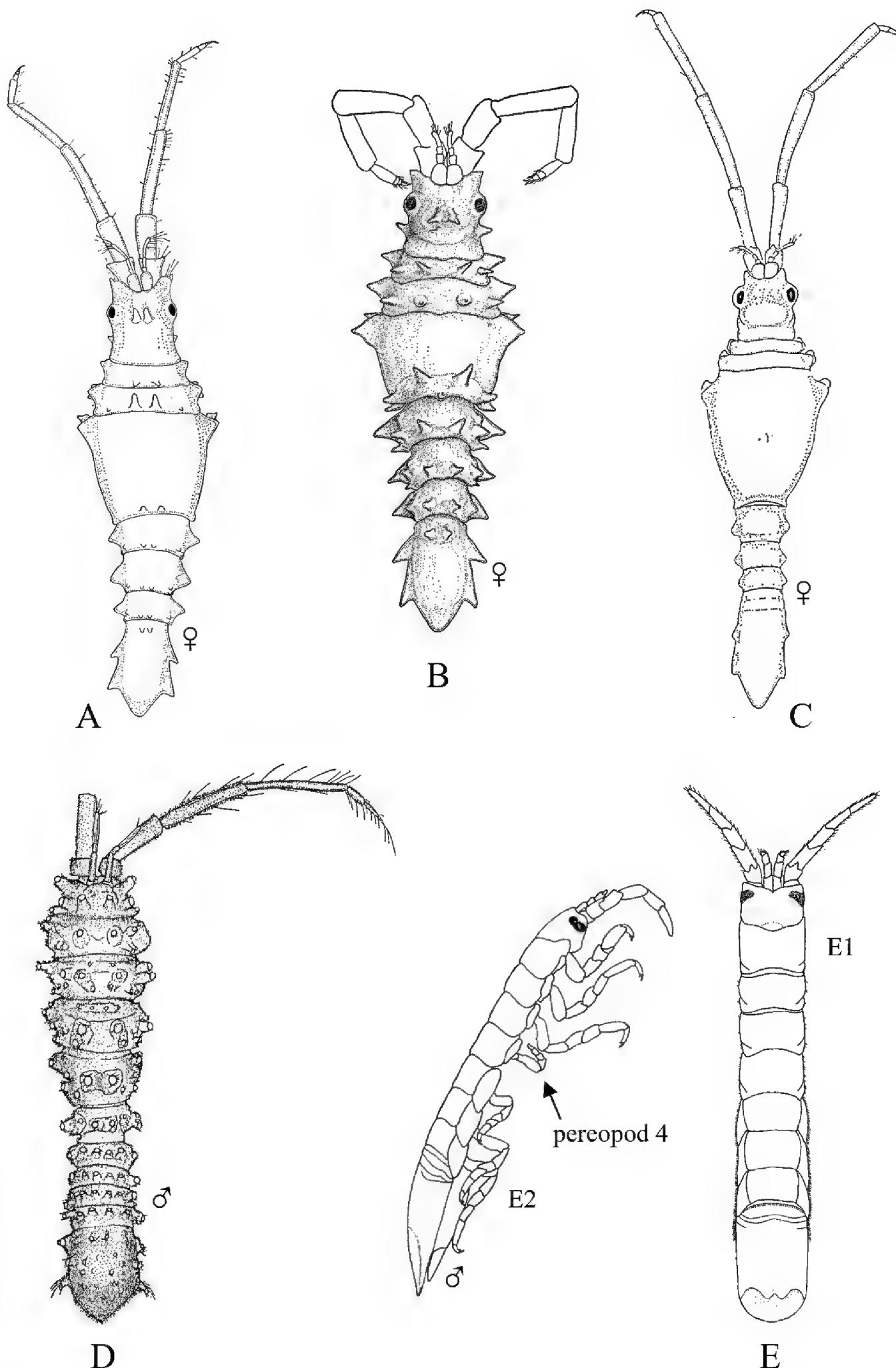
– Head completely fused with pereonite 1, lateral margins entire; flagellum of antennae without blade-like setae; dorsum of pereonites 2–7 typically with 2–4 small to large dorsal spines in females or smooth in males; pleon composed of a single fused pleotelson with 2 anterodorsal median spines ..... 4

4 Fused head and pereonite 1 with shallow dorsal transverse groove (fusion line) posterior to eyes; antennae robust with peduncular articles 3 and 4 each  $\sim 5 \times$  longer than wide; pereonites 2–7 with large, broadly triangulate anterolateral or lateral extensions and a transverse row of 4 large posterodorsal spines; pereonites 4–6 also with medium to large posterolateral spines (Fig. 25B)<sup>Endnote 20</sup> ..... *Idarcturus hedgpethi*

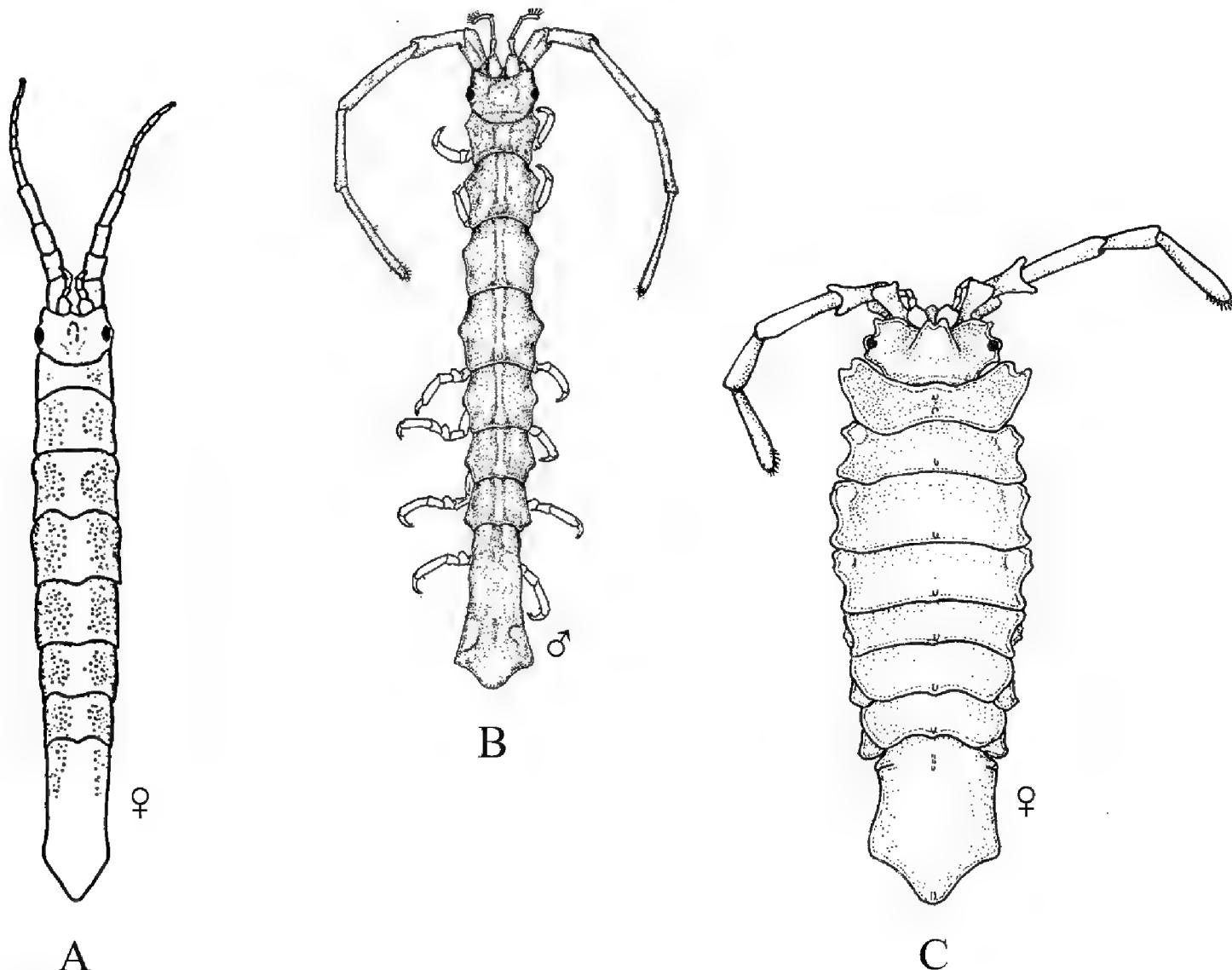


**Figure 24.** Comparison of maxillipedes and number of articles in maxillipedal palps (3–5) between genera and families of SCB valviferan isopods: **A** 3-article maxillipedal palps **B** 4-article maxillipedal palps **C** 5-article maxillipedal palps.

- Fused head and pereonite 1 without dorsal transverse groove; antennae relatively long and narrow with peduncular articles 3 and 4 each  $> 10 \times$  longer than wide; lateral extensions of pereonites 2–7 not as above, and each one with pair of medial posterodorsal spines (size variable); pereonites 5–7 also with 2 smaller distinct lateral spines..... 5
- 5 Body color typically golden; pereonites 2–4 anterolateral extensions medium in size, broad at base and distally blunt or obtusely rounded; pereonites 5–7 lateral extensions broadly triangular; anterolateral margins of head and antennal peduncular article 1 acute, but not produced forward as recurved spines (Fig. 25A)  
Endnote 20 ..... *Idarcturus allelomorphus*
- Body color whitish; pereonites 2–7 anterolateral or lateral extensions narrowly triangular and sharply acute; anterolateral margins of head and peduncular article 1 of antennae distinctly produced forward as sharply acute recurved spines<sup>Endnote 20</sup>.  
..... *Idarcturus* sp. A
- 6 Pereopod 4 greatly reduced, non-ambulatory; pleon composed of 4 segments with pair of elevated dorsal humps near posterior end; lateral margins of body with dense tufts of setae (Fig. 25E) ..... *Cleantioides occidentalis* [Holognathidae]
- Pereopod 4 not reduced, all pereopods ambulatory; pleon composed of 1 or 3 segments; dorsal surface of pleon and lateral margins of body not as above ..... 7 [Idoteidae]
- 7 Pleon composed of single fused pleotelson, with or without partial suture lines or indentations ..... 8
- Pleon composed of 3 to 4 segments, including 1 pair of partial sutures ..... 19
- 8 Pleotelson without suture lines ..... 9
- Pleotelson with 1 pair of partial suture lines or indentations ..... 10
- 9 Flagellum of antennae multiarticulate, head with distinct, slightly elongated dorsal tubercle; pereon dorsally smooth (Fig. 26A) ..... *Stenosoma wetzerae*
- Flagellum of antennae uniarticulate, flagellar article large and clavate; head with large, multilobed or conical tubercle or elevation; pereonites 1–5 with (female) or without (male) middorsal spines (Fig. 26B) ..... *Erichsonella crenulata*
- 10 Antennae shorter than or subequal to antennules, antennal flagellum reduced to single vestigial article; maxillipedal palp of 3 articles; pleonal fusion indicated by 1 pair of lateral grooves instead of distinct incisions ..... 11
- Antennae much longer than antennules, antennal flagellum multiarticulate or comprising a single, large clavate article; maxillipedal palp of 3 or 4 articles; pleotelson with distinct lateral incisions ..... 12
- 11 Pleotelson with dorsal transverse ridge ca. midway between lateral insertions and posterior border, without dorsal swellings; lateral margins of pereonite 4 in females angular, but not forming acute posterolateral projections; propodi of pereopods with 2 large proximal spines along inferior margins (Fig. 27B)<sup>Endnote 21</sup> ..... *Edotia* sp. B
- Pleotelson inflated or bulbous with large dorsal swellings, without a dorsal transverse ridge; lateral margins of pereonite 4 in females form acute posterolateral projections; propodi of pereopods without large proximal spines along inferior margins (Fig. 27A) ..... *Edotia sublittoralis*



**Figure 25.** Isopoda, Valvifera, Arcturidae: **A** *Idarcturus allelomorphus* (after Menzies and Barnard 1959) **B** *Idarcturus hedgpethi* (after Menzies 1951b) **C** *Neastacilla californica* (after Menzies and Barnard 1959). Thermoarcturidae: **D** *Califarcturus tannerensis* (after Schultz 1966). Holognathidae: **E** *Cleantiooides occidentalis* **E1** dorsal view (after Brusca and Wallerstein 1979a) **E2** lateral view of *C. verecundus* from Florida showing reduced size of pereopod 4 characteristic of *Cleantiooides* (after Kensley and Clark 1998).



**Figure 26.** Isopoda, Valvifera, Idoteidae (in part): **A** *Stenosoma wetzerae* (after Ormsby 1991) **B** *Erichsonella crenulata* (after Menzies 1950b) **C** *Eusymmerus pseudoculata* (after Menzies and Bowman 1956).

12 Flagellum of antennae uniarticulate, flagellar article large and clavate; head with large, median bifid tubercle projecting anteriorly over frontal margin; anterolateral margins of pereonite 1 produced into bilobed processes (Fig. 26C) .....  
 ..... *Eusymmerus pseudoculata*

– Antennal flagellum multiarticulate; head and pereonite 1 not as above..... 13

13 Maxillipedal palp 4-segmented (Fig. 24B) ..... 14

– Maxillipedal palp 3-segmented (Fig. 24A) ..... 16

14 Eyes large, oval to subpyriform in shape, situated at mid-lateral margins of head; lateral margins of pleotelson flare slightly outward to form obtuse posterolateral angles, after which they taper inwards to strongly acuminate apex; coxal plates of pereonites not visible dorsally (Fig. 27C) ..... *Colidotea findleyi*

– Eyes small or large, situated laterally on head adjacent to anterolateral angles of pereonite 1; pleotelson not as above, with rounded or obtuse apex; coxal plates of some posterior pereonites visible dorsally ..... 15

15 Eyes large; head not deeply immersed in pereonite 1, dorsal surface with a large, medial, apically rounded rostrum-like process; lateral margins of pereon convex, widest around pereonite 4; coxal plates visible dorsally on pereonites 5–7 (or just pereonites 6 and 7); commensal on sea urchins *Strongylocentrotus purpuratus* and

*Mesocentrotus franciscanus* with body of live isopods matching purple or dark red color of host urchin, but fading to bluish gray in alcohol (Fig. 27D).....  
..... ***Colidotea rostrata***

– Eyes very small; head deeply immersed in pereonite 1, without a large dorsal process; lateral margins of pereon not convex, generally straight-sided from pereonites 1–4 and then becoming slightly wider from pereonites 5–7; coxal plates visible dorsally on pereonites 4–7 (Fig. 27E) ..... ***Colidotea wallersteini***

16 Body smooth, but with triangulate anterior median dorsal pattern on pereonites 2–4; lateral margins of pereonites rounded to straight; posterior margin of pleotelson emarginate (Fig. 28B) ..... ***Synidotea harfordi***

– Body sculptured with conspicuous tubercles or longitudinal rugae; lateral margins of pereonites angular; pleotelson spatulate, rounded posteriorly<sup>Endnote 22</sup> ..... **17**

17 Lateral margins of adult body roughly parallel, widest part of pereon subequal in width to pleon; pleotelson widest at midpoint; dorsal sculpturing generally reduced to low, conical tubercles on head and medial row of tubercles along pereonites; eyes small and lightly pigmented (Fig. 28A) ..... ***Synidotea calcarea***

– Lateral margins of adult body not parallel, generally widest at pereonites 3 and 4; pleotelson widest anteriorly; dorsal sculpturing variable, pereonites with 3 to 4 longitudinal rugae on lateral areas; eyes large and heavily pigmented..... **18**

18 Flange present on basis of pereopods 2–6 in adults, but tiny and difficult to see or not visible in juveniles; anteromedial tubercles of head generally large, highly variable with size, often asymmetrical, becoming broad, flattened, and forward projecting in large specimens; coxae of pereonite 1 not notched laterally; body surface appearing rough, color brownish (Fig. 28C) ..... ***Synidotea magnifica***

– Flange absent on basis of pereopods; anteromedial tubercles not as above, typically smaller, narrowly rounded or conical; lateral margins of pereonite 1 deeply notched in lateral view, separating coxal margins into upper and lower lobes; body surface generally smooth and whitish (Fig. 28D) ..... ***Synidotea media***

19 Maxillipedal palp 4-segmented in adults, article 4 much larger than article 3 (Fig. 24B)<sup>Endnote 23</sup> ..... **20**

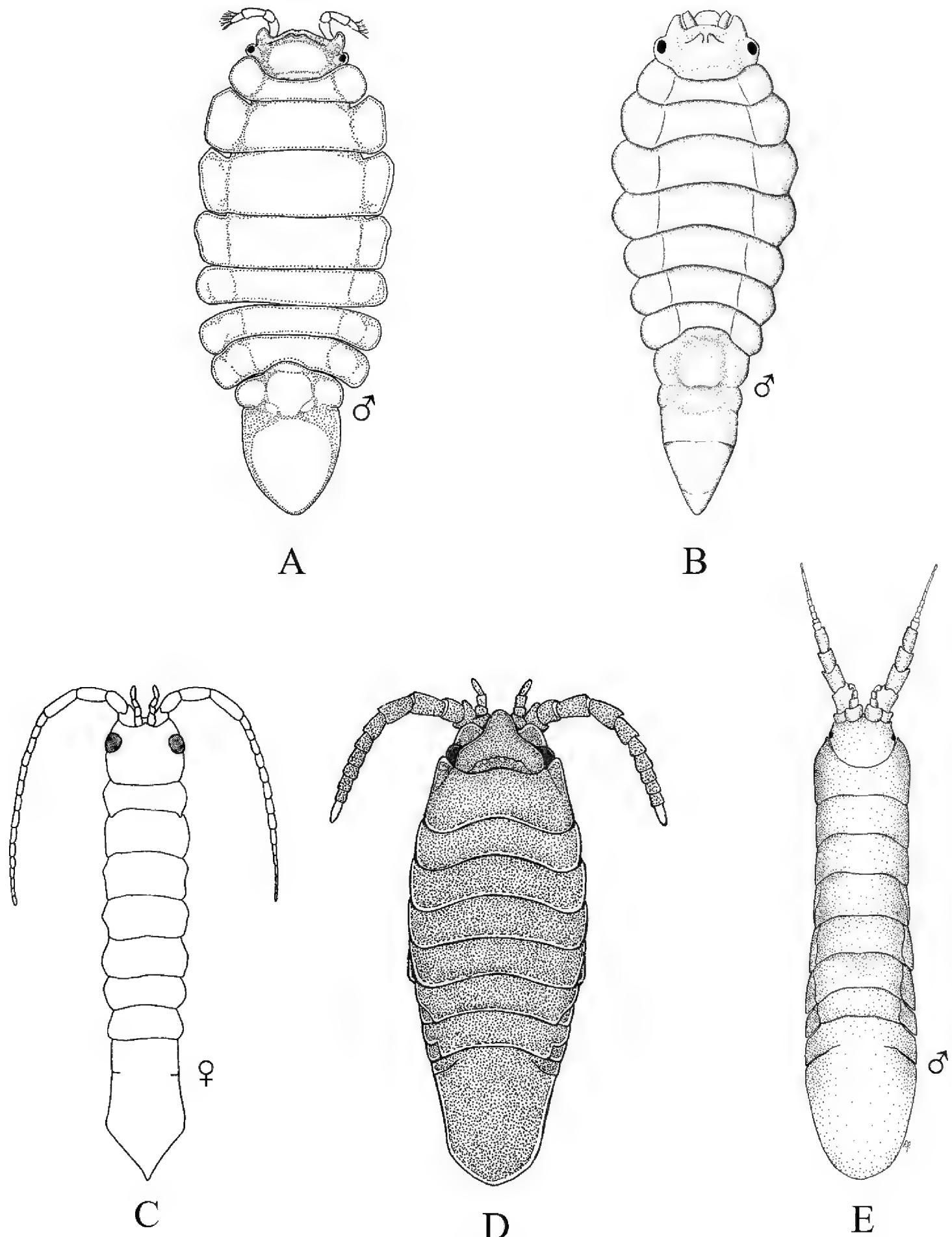
– Maxillipedal palp 5-segmented in adults, article 5 much smaller than article 4 (article 5 may not be developed in juveniles) (Fig. 24C) ..... **23**

20 Eyes large, occupying almost entire lateral margins of head; dorsum of head with curved, sharply defined posterior groove; coxal plates of pereonites 2–7 all wide and extending entire length of respective pereonites; pleotelson broadest anteriorly, tapering to truncate posterior border or apex (Fig. 29B).....  
..... ***Idotea metallica***

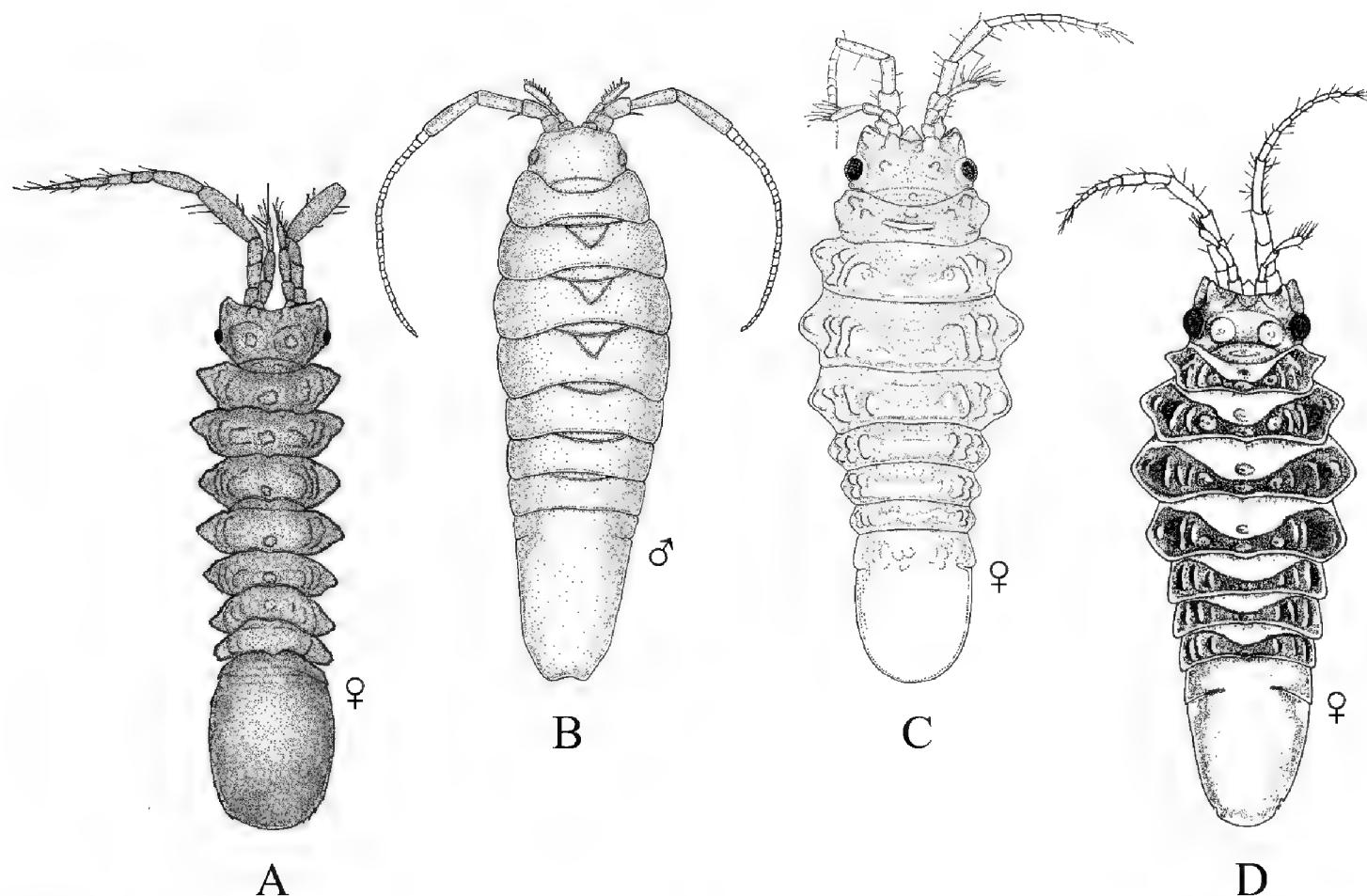
– Eyes small, situated mid-laterally on head; coxal plates of pereonites narrow; pleotelson with concave or acuminate posterior border or apex..... **21**

21 Posterior margin of pleotelson concave with rounded posterolateral corners; coxae 5–7 reach posterior edges of their respective pereonites (Fig. 29C) ... ***Idotea rufescens***

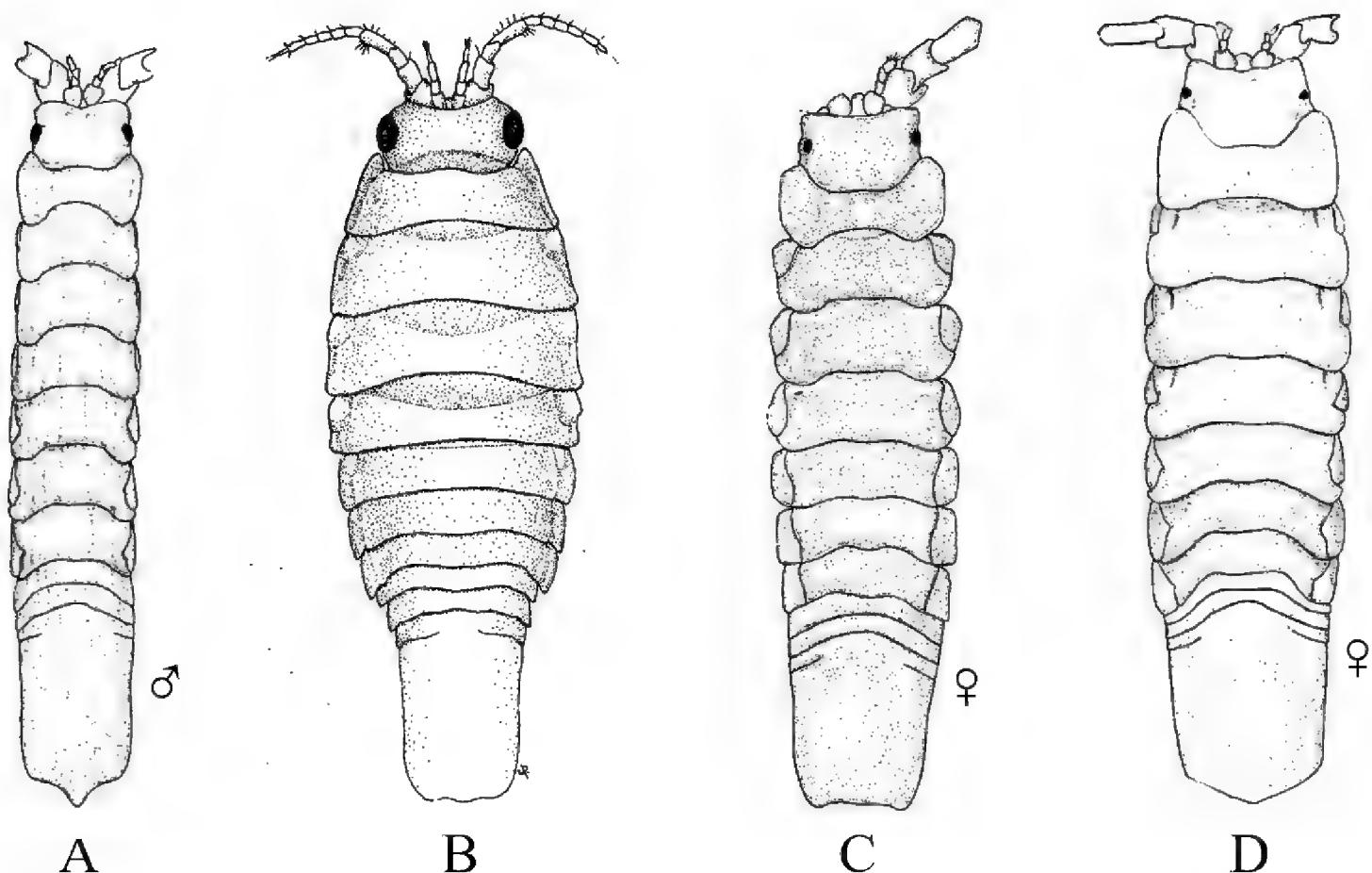
– Posterior margin of pleotelson acuminate, with or without distinct median projection; only coxae 6 and 7 or just 7 reach posterior edges of respective pereonites ..... **22**



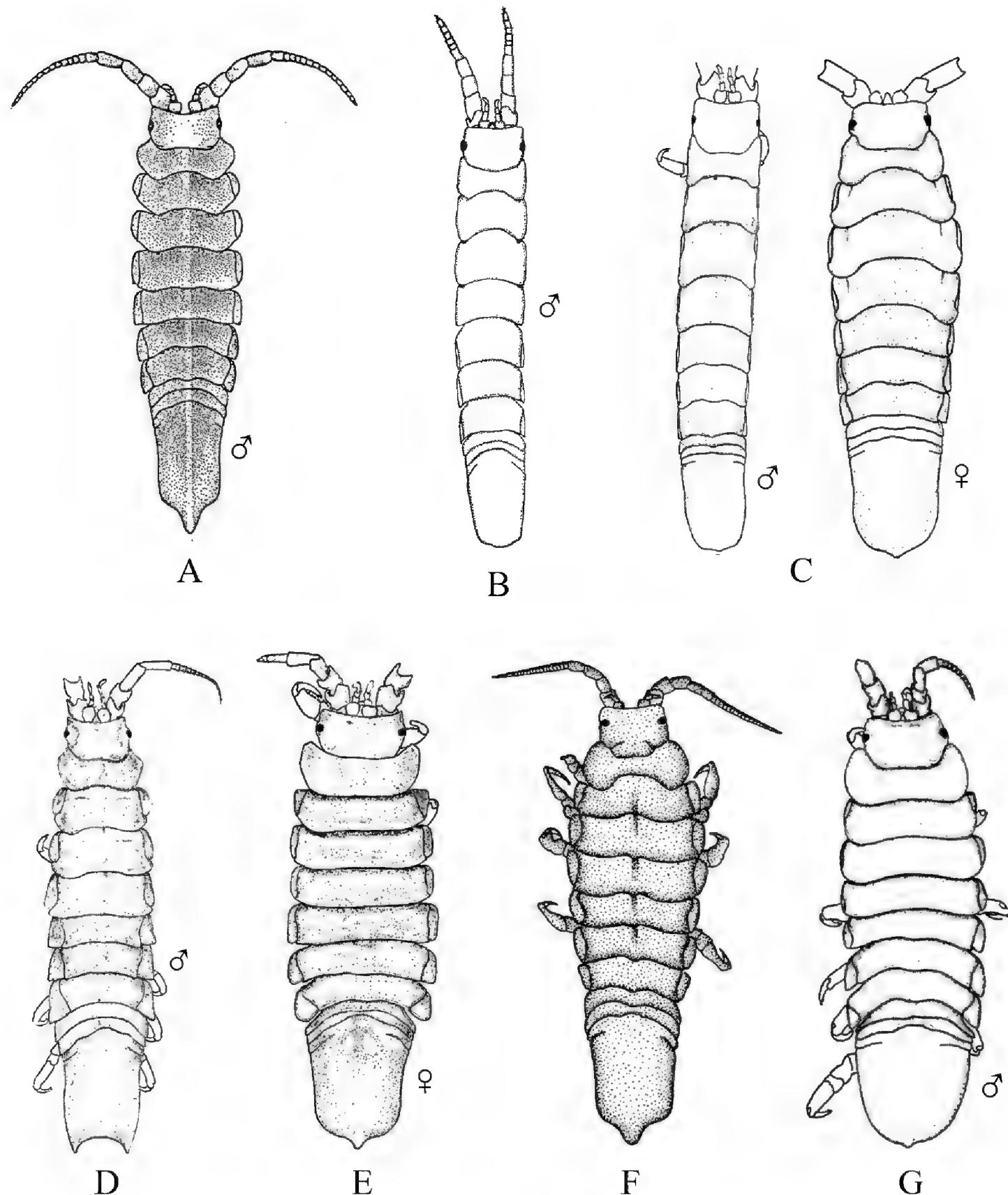
**Figure 27.** Isopoda, Valvifera, Idoteidae (in part): **A** *Edotia sublittoralis* (after Menzies and Barnard 1959) **B** *Edotia* sp. B (after Stebbins 2012c) **C** *Colidotea findleyi* (after Brusca and Wallerstein 1977) **D** *Colidotea rostrata* (after Allen 1976) **E** *Colidotea wallersteini* (after Brusca 1983b).



**Figure 28.** Isopoda, Valvifera, Idoteidae (in part): **A** *Synidotea calcarea* (after Schultz 1966) **B** *Synidotea harfordi* (after Menzies and Miller 1972) **C** *Synidotea magnifica* (after Menzies and Barnard 1959) **D** *Synidotea media* (after Iverson 1972).



**Figure 29.** Isopoda, Valvifera, Idoteidae (in part): **A** *Idotea fewkesi* (after Menzies 1950a) **B** *Idotea mettalica* (after Brusca and Wilson 1991) **C** *Idotea rufescens* (after Menzies 1950a) **D** *Idotea urotoma* (after Menzies 1950a).



**Figure 30.** Isopoda, Valvifera, Idoteidae (in part): **A** *Pentidotea aculeata* (after Stafford 1913b) **B** *Pentidotea kirchanskii* (after Miller and Lee 1970) **C** *Pentidotea montereyensis* (after Menzies 1950a) **D** *Pentidotea resecata* (after Menzies 1950a) **E** *Pentidotea schmitti* (after Menzies 1950a) **F** *Pentidotea stenops* (after Brusca and Brusca 1978) **G** *Pentidotea wosnesenskii* (after Menzies 1950a).

22 Posterior margin of pleotelson triangular, converging to obtuse point; coxae 6 and 7 reach posterior edges of their pereonites; head with apically blunt frontal process (Fig. 29D)..... *Idotea urotoma*  
 – Posterior margin of pleotelson with an elongate median projection; only coxae 7 reach posterior edge of pereonite 7; head with thin, pointed frontal process (Fig. 29A) ..... *Idotea fewkesi*

23 Posterior margin of pleotelson deeply concave with acute posterolateral corners (Fig. 30D)..... *Pentidotea resecata*

— Posterior margin of pleotelson not concave ..... 24

24 Coxae visible dorsally on pereonites 5–7, and occasionally on pereonite 4; posterior margin of pleotelson convex, without median projection; body narrow, with head, pereon and pleotelson subequal in width; apex of frontal process with median notch (Fig. 30B) ..... *Pentidotea kirchanskii*

— Coxae visible dorsally on pereonites 2–7; posterior margin of pleotelson with short (sometimes poorly developed) to elongate median projection; frontal process with or without apical notch ..... 25

25 Pleonite 1 lateral margins curve and taper posteriorly to form narrow, acutely pointed posterolateral angles (margins not parallel) ..... 26

— Pleonite 1 lateral margins truncate or convex, more-or-less parallel, not curving posteriorly to form acute points ..... 27

26 Pleotelson lateral margins concave, posterior margin with median projection; pereonites widely separated laterally, coxae 2–7 reaching posterior edges of pereonites, anterior margins of pereonite 1 separated from head; eyes rectangular or pyriform; apex of frontal process entire, without notch (Fig. 30E) .....

..... *Pentidotea schmitti*

— Pleotelson lateral margins convex, broadly rounded, posterior margin with small median projection; pereonites not widely separated laterally, only coxae 5–7 reach posterior edges of pereonites; anterior margins of pereonite 1 flush with head; eyes reniform; apex of frontal process entire, without notch (Fig. 30G) .....

..... *Pentidotea wosnesenskii*

27 Eyes elongated and thin dorsoventrally; maxilliped with 1–3 coupling hooks; coxae of pereonites 2–7 contiguous with each other (Fig. 30F) .....

..... *Pentidotea stenops*

— Eyes not elongated; maxilliped with 1 coupling hook; coxae of at least some pereonites not contiguous with each other ..... 28

28 Pleotelson posterior margin with long median projection; lateral margins of pereonite 1 convex; eyes circular to oval; apex of frontal process notched (Fig. 30A) .....

..... *Pentidotea aculeata*

— Pleotelson posterior margin with small or poorly developed median projection, sometimes appearing slightly truncate; lateral margins of pereonite 1 barely rounded, almost parallel; eyes with straight anterior and convex posterior borders; apex of frontal process entire, without notch (Fig. 30C) .....

..... *Pentidotea montereyensis*

#### Key I. Suborder Asellota, Superfamilies Janiroidea and Stenetroideoidea

Figs 31–41

1 Eyes present ..... 2

— Eyes absent ..... 36

2 Body (except head) covered with large, jointed-appearing spines; uropods very long if not broken off, with basal segments and rami each ca. as long as width of pleotelson (Fig. 31A)..... *Acanthomunna tannerensis* [Dendrationidae]

– Body and uropods not as above..... 3

3 Eyes sessile, situated dorsolaterally on head but not reaching lateral margins; pleotelson subequal in width to cephalon and most pereonites ..... 4

– Eyes situated laterally on head, bulging outward on short to elongated ocular lobes or peduncle-like projections; pleotelson distinctly narrower than cephalon and widest pereonites ..... 24

4 Head with rounded anterolateral margins and prominent rounded median lobe between antennae; body widest at ca. pereonite 6; adult body length < 3 mm; commensal on or in burrows of sphaeromatid *Sphaeroma quoianum* in bays and estuaries (Fig. 31B) ..... *Iais californica* [Janiridae, in part]

– Head not as above; body lateral margins parallel or gently convex and slightly widest around mid-pereon; maximum adult length varies between ~ 1.3–7.3 mm ..... 5

5 Body elongated and unpigmented, lateral margins parallel and covered with long simple setae; head with acute anterolateral angles and lightly pigmented eyes; pleotelson shield-like with small posterolateral spines; male pereopod 1 strongly subchelate with thick projection on inferior margin of propodus, and many long simple setae on dactylus, propodus, carpus, and merus (Fig. 31C) .....

..... *Stenetrium* sp. A [Stenetriidae]

– Body, head, and male pereopod 1 not as above..... 6

6 Uropods short, inserted in subterminal excavations of pleotelson and not extending much beyond its posterior margin; both antennules and antennae small, flagella lacking or rudimentary; peduncle articles of antennae dilated..... 7 [Joeropsididae]

– Uropods well-developed, extending well beyond posterior margin of pleotelson; both antennules and antennae relatively long with multiarticulate flagella, although flagella often broken off in preserved specimens; peduncle articles of antennae not dilated ..... 11 [Janiridae, in part]

7 Body without pigment, covered with numerous fine simple setae..... 8

– Body typically pigmented, not covered with fine setae..... 9

8 Body elongated and parallel-sided (L:W ratio ~ 4.3); head with distinct indentation on lateral margins below eyes; basal article of antennules with large, outwardly produced distolateral projection bearing ~ 6 sharp, flat spines curving toward article 2; pleotelson lateral margins with 7 large posteriorly curved spines, rest of body with small denticulations on lateral margins (Fig. 32A) .....

..... *Joeropsis concava*

– Body broad and laterally curved (L:W ratio ~ 2.6); margins of head produced forming large lateral plate, with ~ 9 anteriorly curved spines, eyes not reaching lateral margins; basal article of antennules with small distolateral process bearing several lateral curving flat spines; pleotelson with 8 posteriorly curved spines (Fig. 32E)..... *Joeropsis* sp. A

9 Lateral margins of pleotelson without spines; body banded in appearance, with dark brown pigment typically covering head, pereonites 2–4 and 7, and pleotelson;

maxillipedal palp article 2 not produced medially; anterior margin of frontal lamina entire, without fringe of small scales (Fig. 32D) ..... *Joeropsis lobata*

– Lateral margins of pleotelson with 3–7 spines; body typically with diffuse pigment, which may be most pronounced on head and pereonite 4; maxillipedal palp article 2 produced medially; anterior margin of frontal lamina with fringe of small scales ..... 10

10 Lateral margins of pleotelson with 5–7 spines; head typically heavily pigmented, pereon and pleon lightly pigmented or without pigments (Fig. 32B) ..... *Joeropsis dubia dubia*

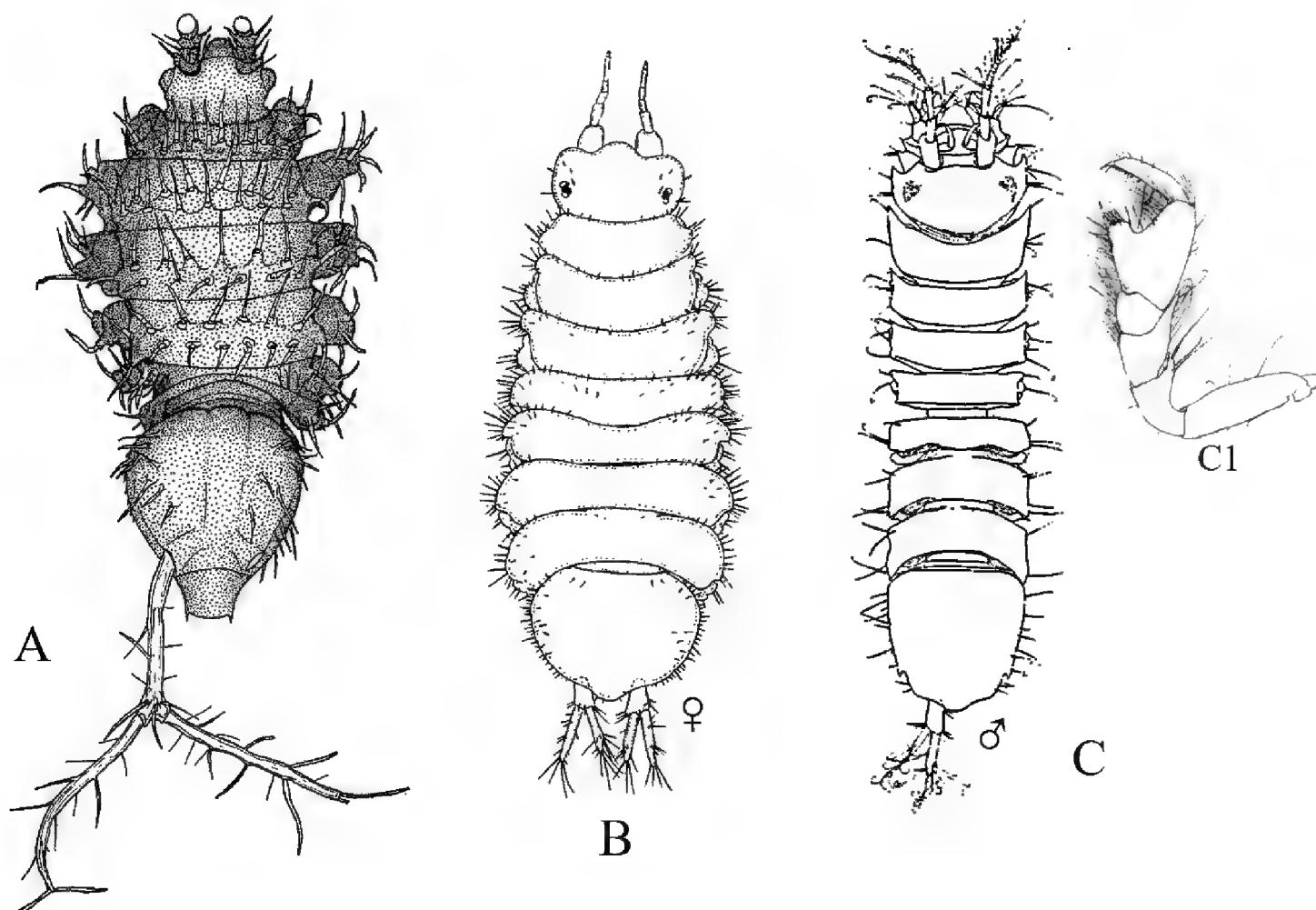
– Lateral margins of pleotelson with 2 or 3 spines; head and pereonite 4 both typically heavily pigmented but compare pigment pattern of head with that of *J. dubia dubia* above (Fig. 32C) ..... *Joeropsis dubia paucispinis*

11 Pereopod 1 with conspicuous serrations or denticles on proximal third of inferior margin of propodus; maxillipedal palp articles 1–3 as wide as endite ..... 12

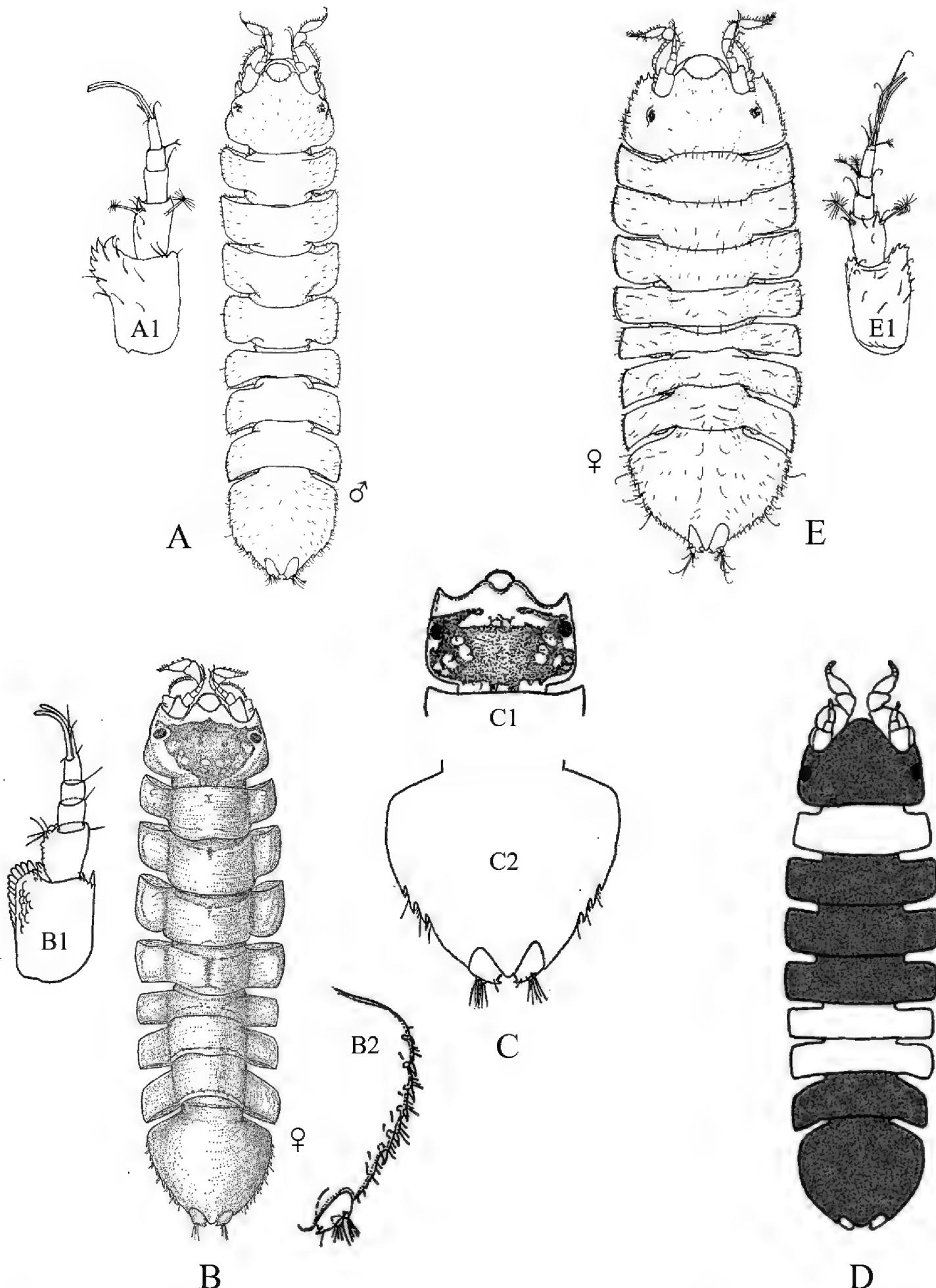
– Pereopod 1 without denticles on proximal third of inferior margin of propodus; maxillipedal palp articles 2 and 3 much wider than endite ..... 19

12 Pleotelson with distinct distolateral angles or spines; head with pointed anterolateral margins and distinct rostrum ..... 13

– Pleotelson without distolateral spines, posterolateral margins rounded; head with pointed or rounded anterolateral margins, with or without rostrum ..... 16



**Figure 31.** Isopoda, Asellota, Janiroidea, Dendrationidae: **A** *Acanthomunna tannerensis* (after Schultz 1966). Janiridae (in part): **B** *Iais californica* (after Menzies and Barnard 1951). Stenetroidea, Stenetroiidae: **C** *Stenetrion* sp. A **C1** pereopod 1 (after Wilson 1997).



**Figure 32.** Isopoda, Asellota, Janiroidea, Joeropsididae: **A** *Joeropsis concava* **A1** = antennule (after Wilson 1997) **B** *Joeropsis dubia dubia* **B1** antennule **B2** lateral margin of pleotelson (after Menzies 1951b) **C** *Joeropsis dubia paucispinis* **C1** head **C2** pleotelson (after Menzies 1951b) **D** *Joeropsis lobata* (after Richardson 1905a) **E** *Joeropsis* sp. A **E1** antennule (after Wilson 1997).

13 Adults with acutely pointed rostrum extending well beyond anterior limits of anterolateral margins of head; body completely devoid of pigment (Fig. 33F).....  
..... ***Janiralata* sp. B**

– Adults with rostrum not extending anteriorly beyond anterolateral margins of head; body pigmented..... **14**

14 Head with acute rostral point; posterior margin of pleotelson concave laterally with convex median lobe that does not extend beyond posterior limits of distolateral spines; species lives commensally on sun stars (*Solaster* spp.), and its occurrence in southern California is questionable (Fig. 33D)..... ***Janiralata solasteri***

– Head with obtuse rostral point; posterior margin of pleotelson with convex lateral areas and obtusely rounded median point that extends posteriorly distinctly beyond limits of distolateral spines..... **15**

15 Body covered with diffuse, anastomosing chromatophores, with pigment extending into region anterior to eyes (Fig. 33E) ..... ***Janiralata* sp. A**

– Body covered with dense, non-anastomosing chromatophores that are absent from region anterior to eyes (Fig. 33B)..... ***Janiralata occidentalis***

16 Head with angular anterolateral margins and short, acute median lobe or slightly rounded median point; eyes medium to large, dorsal, clearly separated from lateral margins of head; body relatively short and broad (L:W ratio < 2.5); pleotelson nearly 2 × as wide as long..... **17**

– Head with rounded anterolateral margins, without distinct median lobe or rostrum; eyes large, almost touching lateral margins of head; body long and narrow (L:W ratio > 3.0); pleotelson ca. as wide as long..... **18**

17 Dorsal surface with numerous black chromatophores; pereonites 1–3 with distinct lateral lobes or lappets, each pair separated by narrow V-shaped slit; all lateral margins with conspicuous setal fringe; posterolateral margins of pereonites 5–7 angular; pereonite 5 not shorter medially than other pereonites (Fig. 33A) ..... ***Janiralata davisi***

– Dorsal surface without pigment, but with many fine setae; pereonites 2 and 3 with short anterior lappets and indistinct posterior lappets; lateral margins without conspicuous setal fringe; posterolateral margins of pereonites 5–7 rounded; pereonite 5 distinctly shorter medially than other pereonites (Fig. 33G) ..... ***Janiralata* sp. C**

18 Body whitish, without distinct chromatophores; pereopod 1 propodus with ~ 12 or 13 denticles on proximoventral border (Fig. 33C)<sup>Endnote 24</sup> .... ***Janiralata rajata***

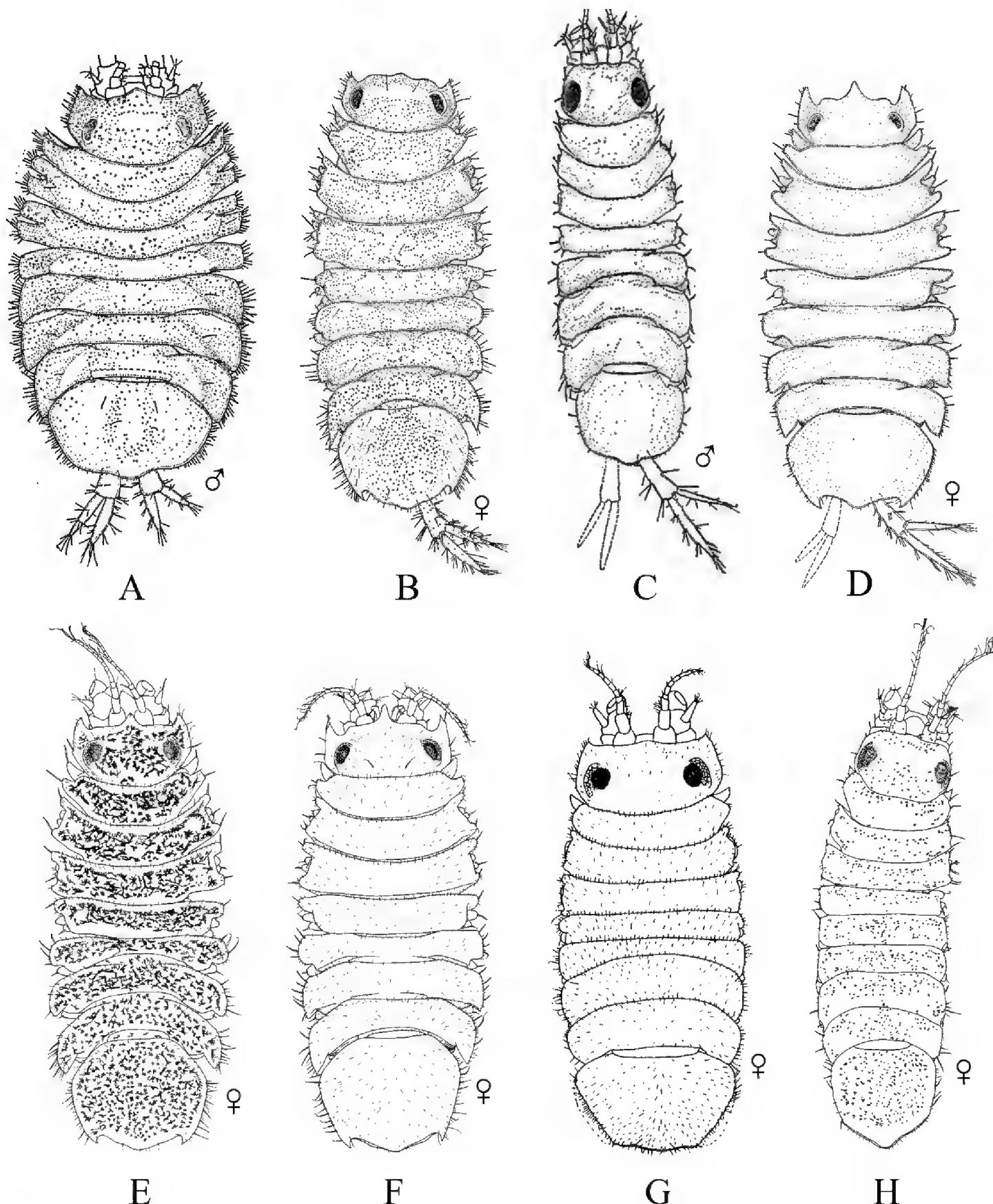
– Body pigmented with numerous dense chromatophores; pereopod 1 propodus with ~ 18 denticles on proximoventral border (Fig. 33H)<sup>Endnote 24</sup> .....  
..... ***Janiralata* sp. D**

19 Lateral margins of pleotelson with spine-like serrations..... **20**

– Lateral margins of pleotelson without serrations, although setae may be present. ....  
..... **21**

20 Pleotelson with 4–7 spine-like serrations on each side (Fig. 34A) .....  
..... ***Ianiropsis analoga***

– Pleotelson with 3 spine-like serrations on each side (Fig. 34F) ..... ***Ianiropsis tridens***



**Figure 33.** Isopoda, Asellota, Janiroidea, Janiridae (in part): **A** *Janiralata davisi* (after Menzies 1951b) **B** *Janiralata occidentalis* (after Menzies 1951b) **C** *Janiralata rajata* (after Menzies 1951b) **D** *Janiralata solasteri* (after Menzies 1951b) **E** *Janiralata* sp. A (after Wilson 1997) **F** *Janiralata* sp. B (after Wilson 1997) **G** *Janiralata* sp. C (after Wilson 1997) **H** *Janiralata* sp. D (after Wilson 1997).

21 Pleotelson with distinct posterolateral angles extended beyond uropodal insertions (Fig. 34B) ..... *Ianiropsis derjugini*  
 – Pleotelson without posterolateral angles, posterior margins rounded ..... 22

22 Uropods relatively short, not exceeding half-length of pleotelson; frontal margin of head truncate (Fig. 34D)..... *Ianiropsis minuta*

— Uropods much longer than half-length of pleotelson; frontal margin of head with short pointed or blunt medial lobe..... 23

23 Uropods very long, exceeding length of pleotelson; lateral apices of male pleopod 1 bifurcate (Fig. 34E) ..... *Ianiropsis montereyensis*

— Uropods not exceeding length of pleotelson; lateral apices of male pleopod 1 not bifurcate (Fig. 34C) ..... *Ianiropsis kincaidi*

24 Pereonites 1–3, 5 and 6 with long, finger-like lateral processes, each with 1 or 2 terminal setae; pleotelson bulbous anteriorly, then tapers posteriorly to a narrow truncate end; uropods inserted dorsolaterally on anterior half of pleotelson, each uropod ca. as long as pleotelson; eyes tiny, each composed of two lenses at tip of very long and thin lateral peduncle or lobe (Fig. 35E)<sup>Endnote 25</sup> ..... *Pleurocope* sp. A [Pleurocopidae]

— Pereonites, pleotelson and uropods not as above; eyes situated at tips of short to elongated ocular lobes ..... 25

25 Antennules and antennae both long, subequal in length; frontal margin of head broadly rounded..... 26 [Paramunnidae, in part]

— Antennae > 2 × longer than antennules; frontal margin of head broadly truncate, with or without medial concavity..... 29 [Munnidae]

26 Pereonites 1–3 with dorsal posterolateral setal tufts; pleotelson as wide or wider than pereonite 7, lateral margins of pleotelson serrate or denticulate anterior to uropodal insertions, denticulations with embedded compound setae in cusps (Fig. 35B) ..... *Boreosignum* sp. A

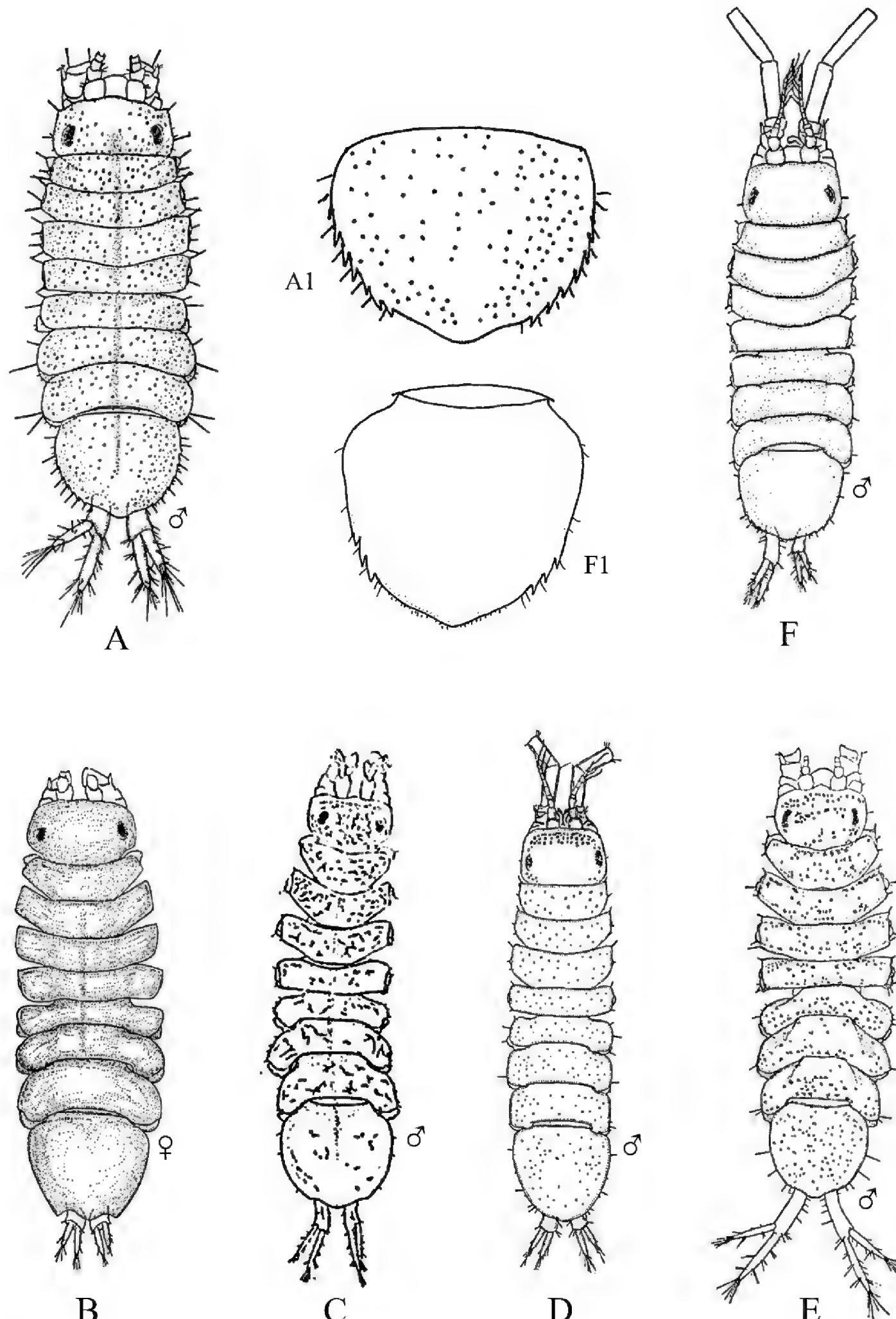
— Pereonites without dorsal setal tufts; pleotelson narrower than pereonite 7, lateral margins convex without lateral serrations or denticulations..... 27

27 Body broadly ovate with pereonites 2 and 3 distinctly wider than pereonites 4 and 5 (body L:W ratio ~ 1.6); head deeply immersed in pereon with pereonite 1 much longer (male) or subequal (female) in length to pereonite 2; eyestalk (ocular lobe) much longer than article 1 of antennules; coxae visible in dorsal view only on pereonites 5–7 (Fig. 35A)..... *Austrosignum latum*

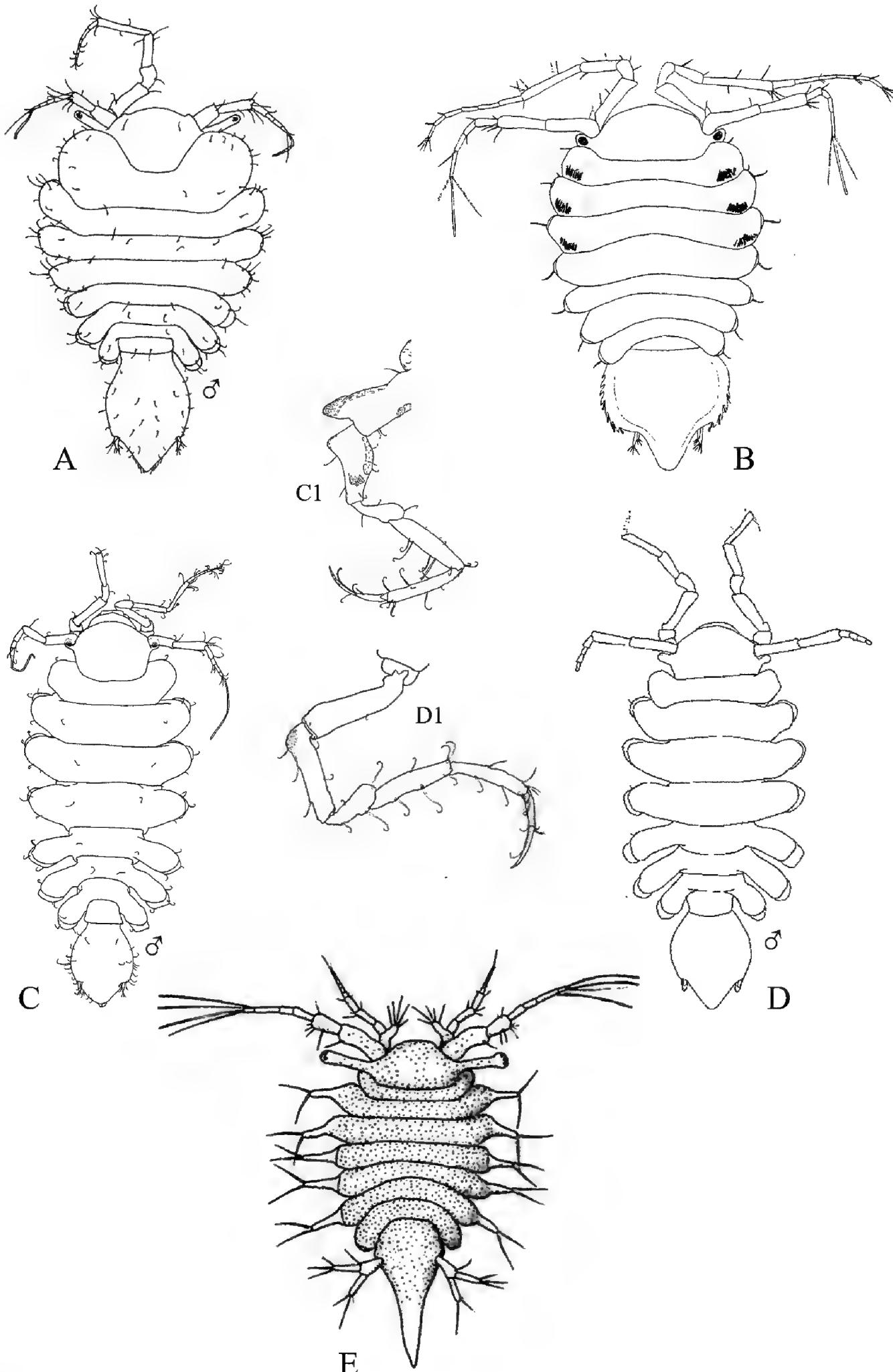
— Body narrower than above with pereonites 2–5 subequal in width (body L:W ratio > 2.0); head not deeply immersed in pereon, with pereonite 1 shorter than pereonite 2 in both sexes; ocular lobes much shorter than article 1 of antennules; coxae visible in dorsal view on at least pereonites 2–7 ..... 28

28 Article 1 of antennules shorter than article 2; pereopod 2 in males with robust subtriangular projection on distoventral corner of basis, and proximal projection on ischium; pereopod 2 ventral margins of propodi with short robust setae (Fig. 35C)<sup>Endnote 26</sup> ..... *Munnogonium erratum*

— Article 1 of antennules subequal in length or longer than article 2; pereopod 2 in males not as above, without distinct projections on basis and ischium; pereopod 2 ventral margins of propodi with simple setae only (Fig. 35D)<sup>Endnote 26</sup> ..... *Munnogonium tillerae*



**Figure 34.** Isopoda, Asellota, Janiroidea, Janiridae (in part): **A** *Ianiropsis analoga* **A1** enlarged dorsal view of pleotelson showing lateral spines (after Menzies 1952) **B** *Ianiropsis derjagini* (after Menzies 1952) **C** *Ianiropsis kincaidi* (after Menzies 1952) **D** *Ianiropsis minuta* (after Menzies 1952) **E** *Ianiropsis montereyensis* (after Menzies 1952) **F** *Ianiropsis tridens* **F1** enlarged dorsal view of pleotelson showing lateral spines (after Menzies 1952).



**Figure 35.** Isopoda, Asellota, Janiroidea, Paramunnidae (in part): **A** *Austrosignum latum* (after Just and Wilson (2021)) **B** *Boreosignum* sp. A (after Cadien 2008) **C** *Munnogonium erratum*, **C1** male pereopod 2 (after Wilson 1997) **D** *Munnogonium tillerae* **D1** male pereopod 2 (after Just and Wilson (2021)). Pleurocopidae: **E** *Pleurocope floridensis* (Caribbean species = representative for *Pleurocope* sp. A; after Kensley and Schotte 1989).

29 Pleotelson with 4–6 spines or serrations on ventrolateral margins; male pleopod 1 apically pointed (Fig. 36H) ..... *Uromunna ubiquita*

– Pleotelson without spines on lateral margins; male pleopod 1 with apices laterally expanded ..... 30

30 Pleotelson with concave posterolateral margins; posterior border of pereonite 7 convex (Fig. 36D) ..... *Munna magnifica*

– Posterolateral margins of pleotelson not concave, although small indentations may be present around uropodal insertions; pereonite 7 with deeply concave posterior border wrapping around anterior portion of pleotelson ..... 31

31 Uropods with large acute spine-like protuberances on distal margins; pleotelson posterior margin without subanal channel or shelf visible in dorsal view ..... 32

– Uropods without spine-like protuberances on distal margins; pleotelson with or without subanal shelf visible in dorsal view ..... 33

32 Lateral margins of pleotelson with 2 or 3 backwards-curved robust sensory setae on each side; pleotelson broad medially, nearly as wide as long (Fig. 36F) ..... *Munna stephensi*

– Lateral margins of pleotelson without robust sensory setae; pleotelson narrow, much longer than wide (Fig. 36A) ..... *Munna chromatocephala*

33 Frontal margin of head with ~ 8 stout, 2-pointed spines; lateral margins of pereonites 1–6 with stout spines; pleotelson without subanal shelf (Fig. 36E) ..... *Munna spinifrons*

– Margins of head and pereonites without spines, although setae may be present; pleotelson with subanal shelf visible in dorsal view ..... 34

34 Eyes small, occupying ca. half of short ocular lobes; body surfaces smooth, not covered with setae; uropods tiny, hidden within short, broad subanal shelf (Fig. 36C) ..... *Munna halei*

– Eyes large, occupying most of prominent ocular lobes; all dorsal surfaces covered with fine simple setae; uropods larger and clearly visible, not hidden by subanal shelf ..... 35

35 Subanal shelf short and broad, reaching but not obscuring uropods; male pleopod 1 with large sensillate setae on ventral surface (Fig. 36B) ..... *Munna fernaldi*

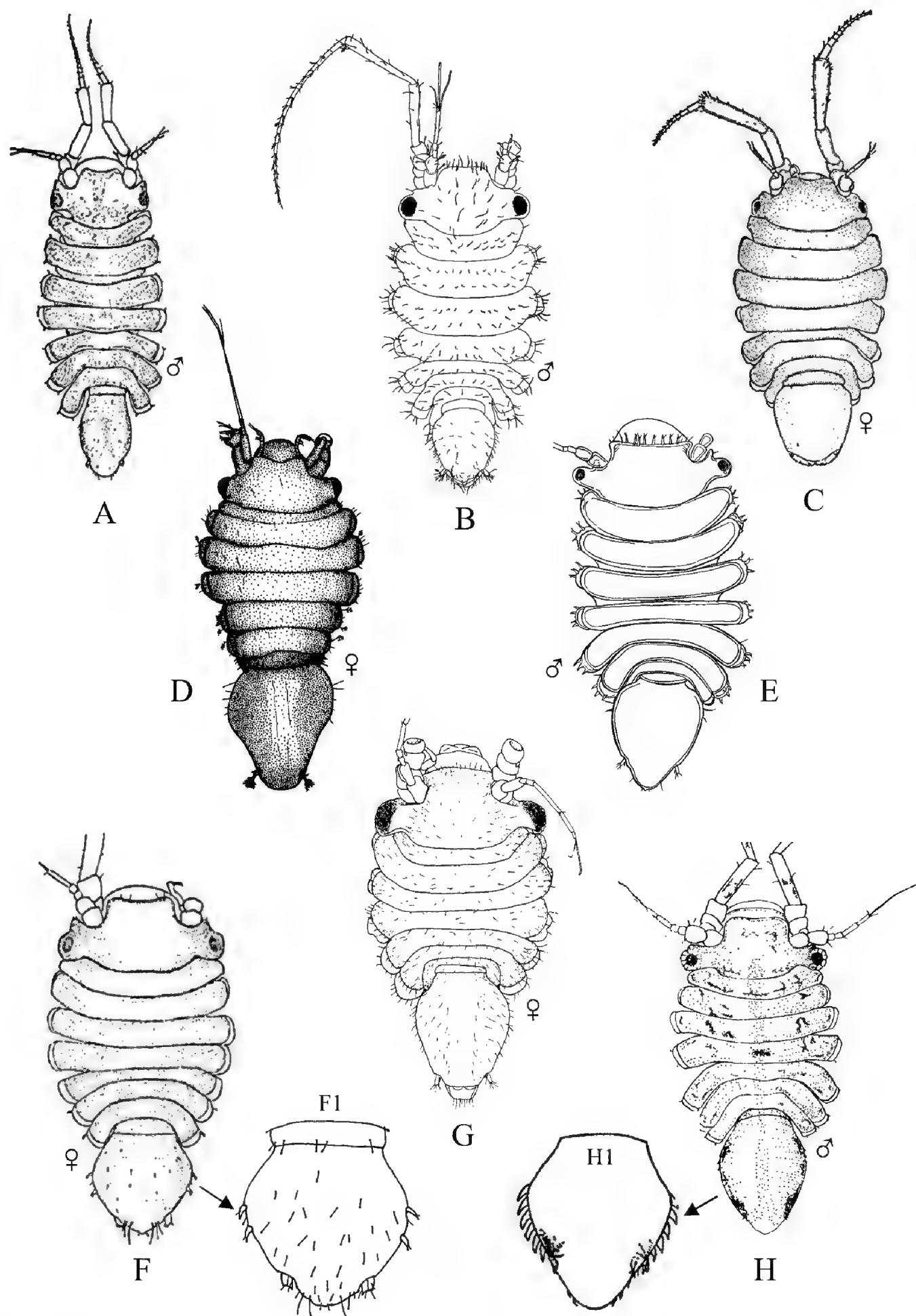
– Subanal shelf elongated posteriorly, but no wider than anus and not reaching or extending under uropods; male pleopod 1 with short simple setae on ventral surface (Fig. 36G) ..... *Munna* sp. A

36 Surface of body covered with many small spines and fewer large spines; dorsal surface of pleotelson with pair of large stout posterior protuberances, each with 3 large distal spines (Fig. 37) ..... *Haplomunna caeca* [Haplomunnidae]

– Surface of body and pleotelson not as above ..... 37

37 Pereopods 5–7 expanded and natatory, with enlarged, paddle-like carpi and propodi; posterior body arranged as distinctive natosome, consisting of partially or completely fused pereonites 5–7 and the pleotelson ..... 38 [Munnopsidae]

– Pereopods 5–7 without enlarged, paddle-like carpi and propodi; posterior part of body without distinct natosome ..... 43



**Figure 36.** Isopoda, Asellota, Janiroidea, Munnidae: **A** *Munna chromatocephala* (after Menzies 1952) **B** *Munna fernaldi* (after George and Strömberg 1968) **C** *Munna halei* (after Menzies 1952) **D** *Munna magnifica* (after Schultz 1964) **E** *Munna spinifrons* (after Menzies and Barnard 1959) **F** *Munna stephensi* **F1** close-up of pleotelson, arrow indicating sensory setae on left lateral margin (after Menzies 1952) **G** *Munna* sp. A (after Wilson 1997) **H** *Uromunna ubiquita* **H1** close-up of pleotelson, arrow indicating spines or serrations on right lateral margin (after Menzies 1952).

38 Head with bilobed or pointed rostrum projecting anteriorly between antennules ..... 39

– Head without rostrum extending between antennules ..... 40

39 Head with broad, indented (bilobed) rostrum; natasome flattened, tapering; pereonites 5 and 6 fused dorsally; pereonite 7 smaller and narrower than pereonites 5 and 6 (Fig. 38A) ..... *Belonectes* sp. A

– Head with narrow, roundly pointed rostrum, not bilobed; natasome robust and deep; pereonites 5 and 6 not fused dorsally; pereonite 7 larger than pereonites 5 and 6 (Fig. 38B) ..... *Eurycope californiensis*

40 Natasome not triangular, pleotelson inflated dorsally with relatively straight lateral margins; pereonites 5–7 subequal in size; uropodal protopod small, tubular ..... 41

– Natasome triangular, lateral margins of pleotelson taper to pointed apex; pereonite 7 distinctly narrower than pereonites 5 and 6; uropodal protopod large, flattened ..... 42

41 Head subequal in width to pereonite 1; small species, with body length of adults < 2 mm (Fig. 38E) ..... *Munnopsurus* sp. A

– Head very large, distinctly broader than pereonite 1; much larger species than above, with body length of adults reaching 7 mm (Fig. 38F) ..... *Munnopsurus* sp. B

42 Anterior margins of pereonites 1–4 with large pedestal setae (Fig. 38C) ..... *Ilyarachna acarina*

– Anterior margins of pereonites 1–4 with small, non-pedestal setae (Fig. 38D) .... *Ilyarachna profunda*

43 Body with conspicuous setal fringe on lateral margins; head trilobate anteriorly; pleotelson wider than long with concave posterior margins at uropodal insertions and blunt median apex; basal article of antennules greatly expanded; article 3 of antennae with elongate, setiferous scale; small intertidal isopods that live in burrows in wood excavated by limnoriid isopods (Fig. 39A) ..... *Caecijaera horvathi* [Janiridae, in part]

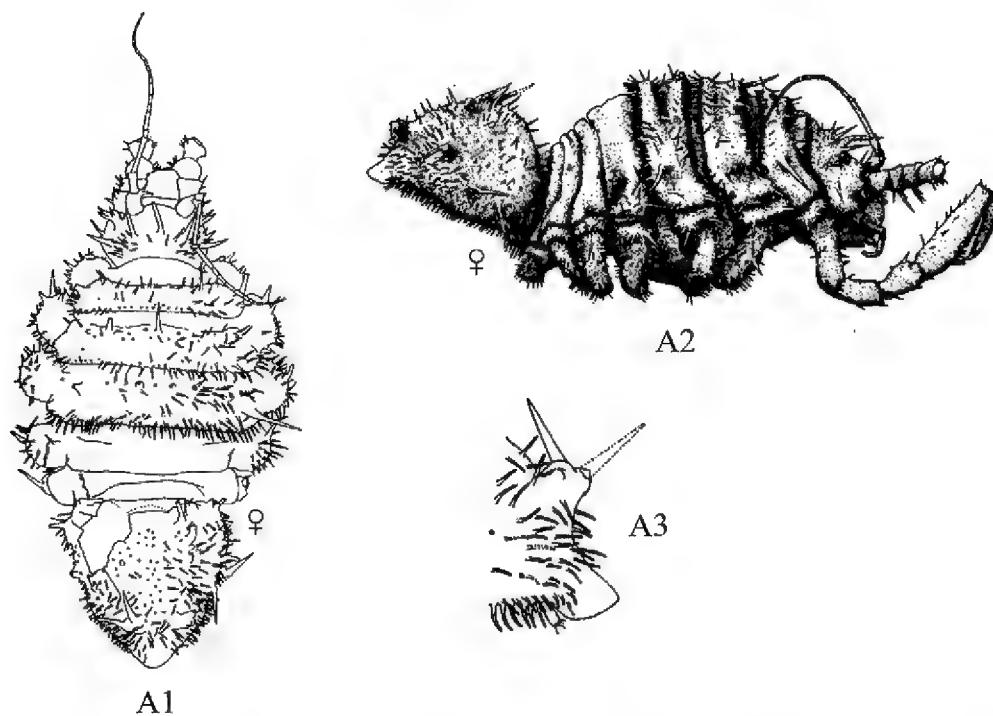
– Body and habitat not as above ..... 44

44 Body greatly elongated, > 6 × longer than wide; lateral margins generally parallel with head, pereonal, and pleonal segments subequal in width ..... 45

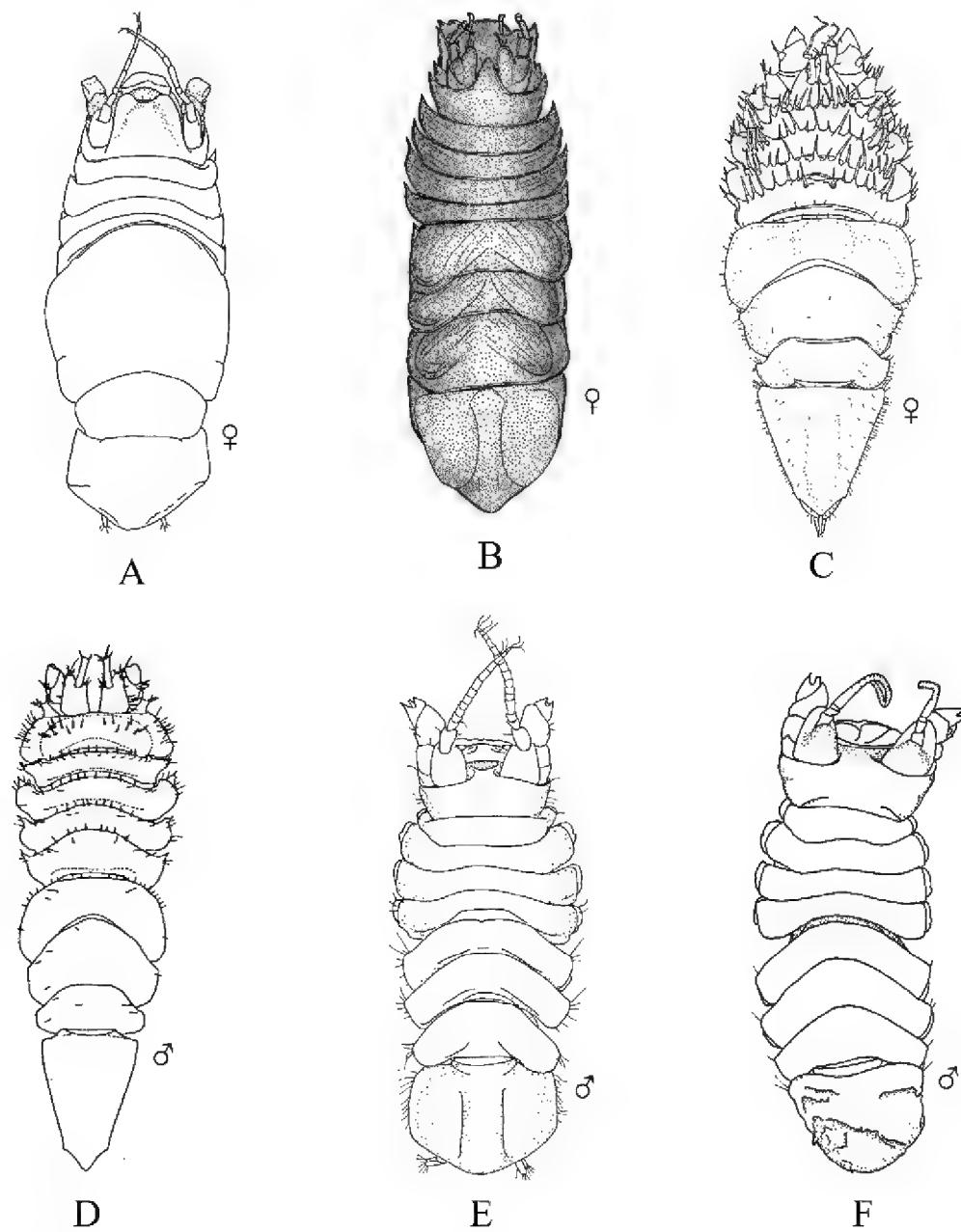
– Body not as long as above, ≤ 4.5 × longer than wide; lateral margins distinctly not parallel ..... 47

45 Antennae with strong scale on peduncular article 3; uropods long and distinct, protopod subequal in length to pleotelson and half as wide, sides parallel until pinching off slightly towards distal medial tip; uropodal endopod ca. one-third length of protopod and attached subapically; uropodal exopod ca. half-length of endopod and attached more laterally near where protopod begins to curve inwards (Fig. 39C)<sup>Endnote 27</sup> ..... *Microcharon* sp. A [Lepidocharontidae]

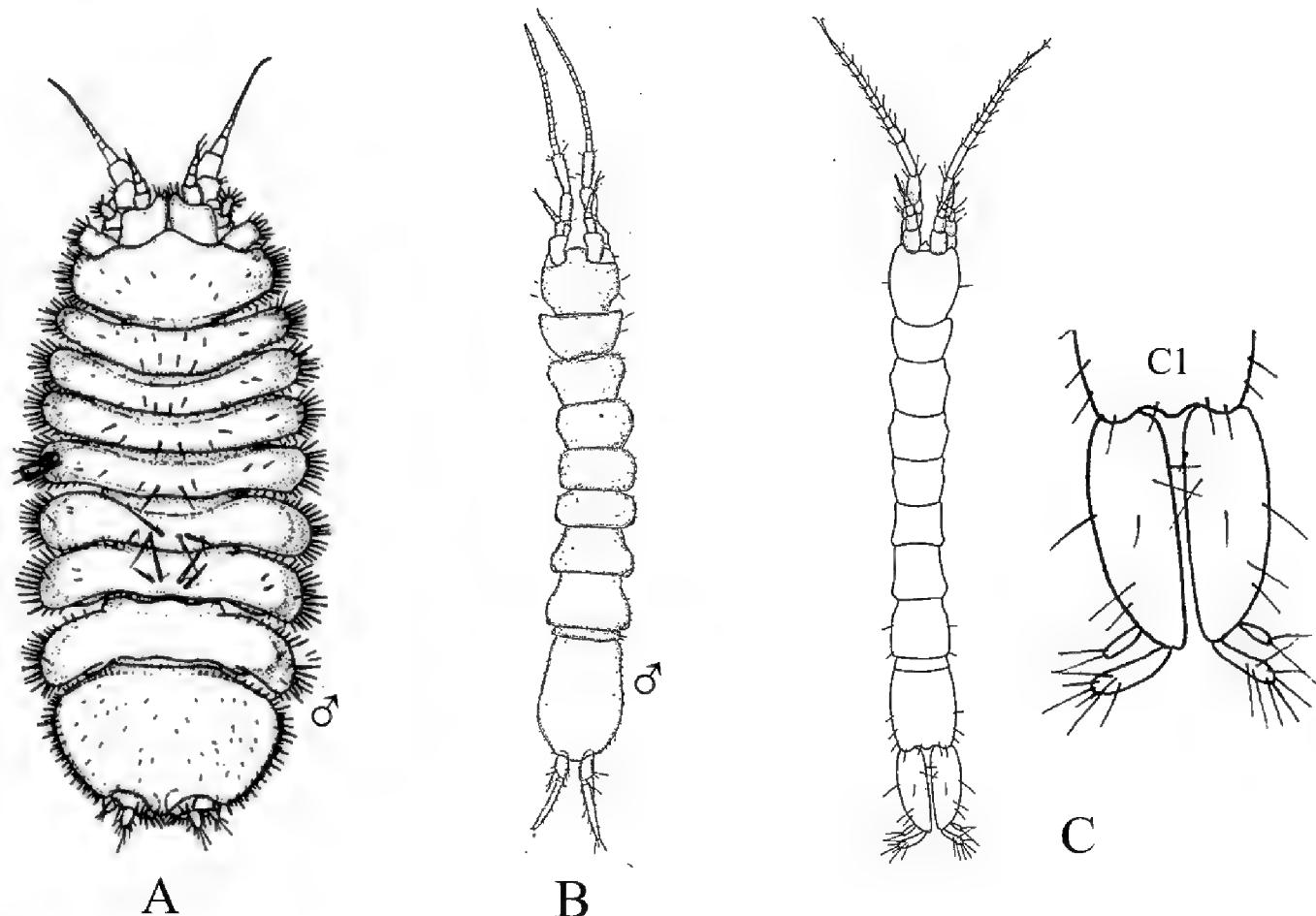
– Antennae without scale on peduncle; uropods styliform, not as above (Fig. 39B) [Janiridae, in part] ..... 46



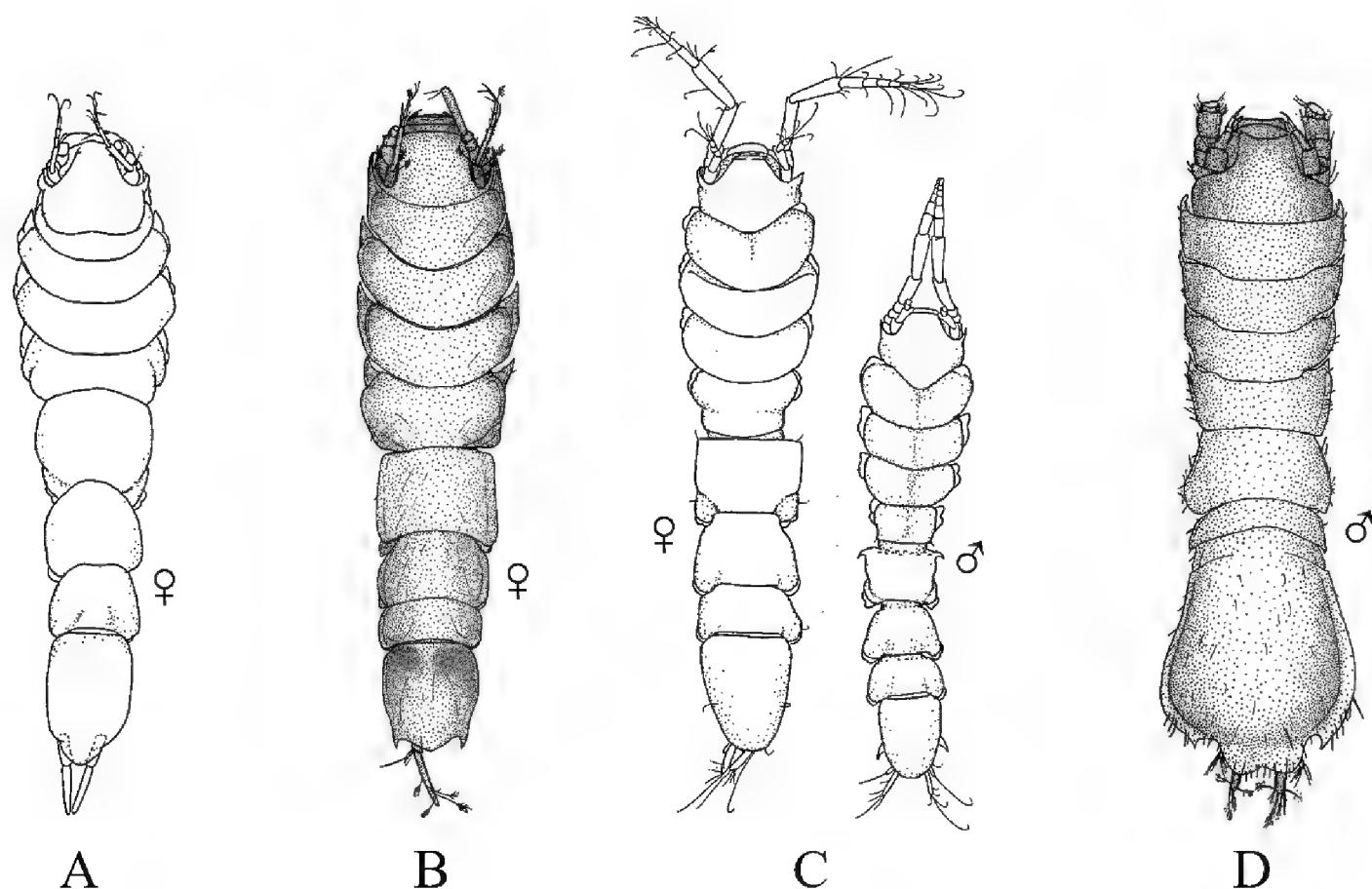
**Figure 37.** Isopoda, Asellota, Janiroidea, Haplomunnidae: **A** *Haplomunna caeca* **A1** dorsal view of brooding female **A2** right lateral view of brooding female **A3** left lateral view of pleotelson tip and 3-spined tubercle (after Wilson 1976).



**Figure 38.** Isopoda, Asellota, Janiroidea, Munnopsidae: **A** *Belonectes* sp. A (after Wilson 1997) **B** *Eurycope californiensis* (after Schultz 1966) **C** *Ilyarachna acarina* (after Thistle 1979) **D** *Ilyarachna profunda* (after Thistle 1979) **E** *Munnopsurus* sp. A (after Wilson 1997) **F** *Munnopsurus* sp. B (after Wilson 1997).



**Figure 39.** Isopoda, Asellota, Janiroidea, Janiridae (in part): **A** *Caecijaera horvathi* (after Menzies 1951c) **B** *Caecianiropsis psammophila* (northern California species = representative for *Caecianiropsis* spp. LA1 and LA2; after Menzies and Pettit 1956). Lepidocharontidae: **C** *Microcharon sabulum* **C1** close-up of uropods (Caribbean species = representative for *Microcharon* sp. A; after Kensley 1984).



**Figure 40.** Isopoda, Asellota, Janiroidea, Desmosomatidae: **A** *Desmosoma* sp. A (after Wilson 1997) **B** *Momedossa symmetrica* (after Schultz 1966) **C** *Prochelator* sp. A (after Wilson (1997); Nannoniscidae: **D** *Nannonisconus latipleonus* (after Schultz 1966).

46 Integument of body with complete and prominent scaling; peduncular article 2 of antennules with  $\geq 3$  strong longitudinal ridges; mandibles whitish, not appearing sclerotized; setal comb present on posteroventral margin of basis of anterior pereopods<sup>Endnote 28</sup> ..... *Caecianiropsis* sp. LA1

— Body with very light and intermittent scaling; peduncle of antennules without longitudinal ridges; mandibles brownish, heavily sclerotized; setal comb absent on posteroventral margins of basis of anterior pereopods<sup>Endnote 28</sup> ..... *Caecianiropsis* sp. LA2

47 Pereonite 7 fused dorsally with pleotelson; body widest at posterior third of pleotelson; posterior margins of pleotelson with large bilobed medial extension and large tooth on each lateral edge (Fig. 40D) ..... *Nannonisconus latipleonus* [Nannoniscidae]

— All pereonites dorsally free; body widest at anterior half of pereon; pleotelson not as above ..... 48

48 Body long and narrow (L:W ratio  $\sim 4.5$ ); pereonites 1–3 only slightly wider than head and pleotelson ..... 49 [Desmosomatidae]

— Body short and broad (L:W ratio  $\leq 2.0$ ); pereonite 1 and usually pereonites 2–6 much wider than head and pleotelson ..... 51 [Paramunnidae, in part]

49 Pereonite 1 distinctly larger than pereonite 2, with large ventral median spine; posteriorly curving ventral median spines also present on pereonites 3 and 7; pleotelson posteriorly rounded, with large subdistal ventrolateral spines (Fig. 40C) ..... *Prochelator* sp. A

— Pereonite 1 subequal or smaller than pereonite 2; ventral median spines absent on all pereonites ..... 50

50 Pereonite 1 subequal to pereonite 2; head with anterolateral spines; pleotelson with posterolateral spines or angles and a rounded posterior medial border; uropods biramous (Fig. 40B) ..... *Momedossa symmetrica*

— Pereonite 1 smaller than pereonite 2; head without anterolateral spines; pleotelson without posterolateral spines; uropods uniramous, lacking exopods (Fig. 40A) ... ..... *Desmosoma* sp. A

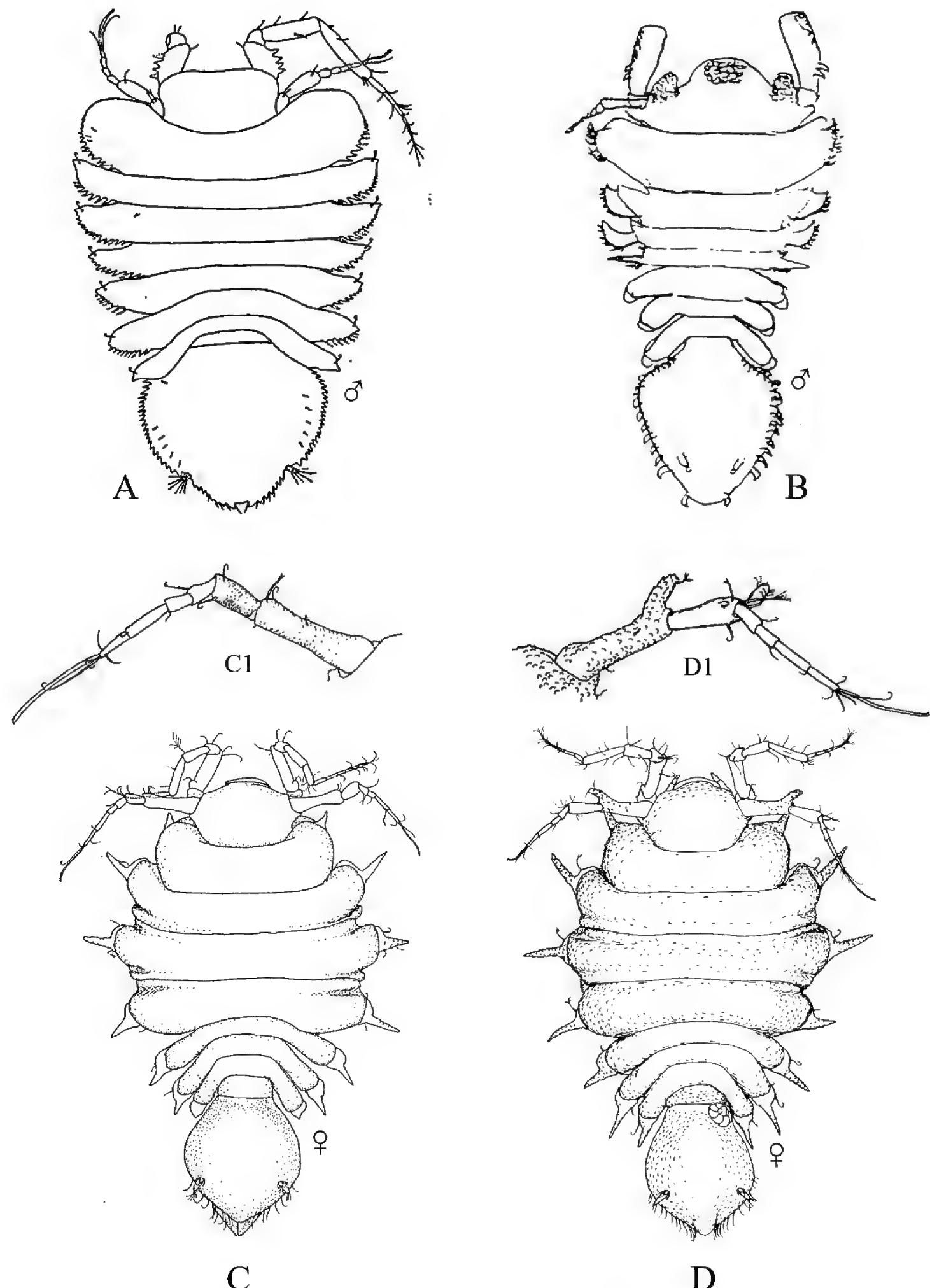
51 Lateral margins of pleotelson serrate with numerous denticulations or spines; coxae of pereonites not visible dorsally ..... 52

— Lateral margins of pleotelson smooth, without denticulations or spines; coxae visible dorsally on pereonites 2–7, most or all with single large projecting spine ..... 54

52 Anterior margin of head broadly quadrate with rounded anterolateral angles; lateral margins of pereonites heavily denticulate; pleotelson ca. as wide as long, lateral margins completely serrate; uropods inserted on posterolateral margins of pleotelson (Fig. 41A) ..... *Paramunna quadratifrons*

— Anterior margin of head with strongly produced and rounded anterior margin; lateral margins of pereonites with or without denticulations or spines; uropods inserted slightly dorsally on pleotelson ..... 53

53 Head with 2 granulate tubercles above antennal bases; body widest at pereonite 1; lateral margins of pereonites serrate, anterior-most tooth enlarged and pointed forward on pereonites 1–3; pleotelson dentate along basal two-thirds of lateral



**Figure 41.** Isopoda, Asellota, Janiroidea, Paramunnidae (in part): **A** *Paramunna quadratifrons* (after Iverson and Wilson 1981) **B** *Paramunna* sp. A (after Cadien 1996) **C** *Pleurogonium californiense* **C1** antennule (after Wilson 1997) **D** *Pleurogonium* sp. A **D1** antennule (after Wilson 1997).

margins, with 2 strong teeth located on rounded end where uropods would typically be inserted (Fig. 41B).....***Paramunna* sp. A**

– Head without granulate tubercles; body widest at pereonites 2 and 3; lateral margins of pereonites without denticulations or spines; pleotelson with serrated lateral margins, although the details are undocumented<sup>Endnote 29</sup> .....***Paramunna* sp. SD1**

54 Basal articles of antennules with large curved anterolateral projections; body surface rough with apparent microscales; projecting spine on each coxa of pereonite 7 typically large and conspicuous (Fig. 41D) .....***Pleurogonium* sp. A**

– Antennules without anterolateral projections on basal articles; surface of body smooth to slightly scaled; coxal spines of pereonite 7 reduced or absent (Fig. 41C) .....***Pleurogonium californiense***

#### Key J. Suborder Oniscidea, Superfamily Oniscoidea

Figs 42, 43

1 Uropods ventral and operculate covering pleopods, not visible in dorsal view; body able to roll up into a ball (conglobate) (Fig. 42D) .....***Tylos punctatus***

– Uropods terminal, visible in dorsal view; body may or may not be able to conglobate.....**2**

2 Flagellum of antenna with > 10 articles; eyes large with > 50 ommatidia each, and wrapping around lateral margins of head, distance between eyes equal to length of 1 eye; isopods unable to conglobate (Fig. 42A)<sup>Endnote 30</sup> .....

.....***Ligia* cf. *occidentalis***

– Flagellum of antenna with 2–4 articles; eyes not as above, much smaller (< 30 ommatidia) and not wrapping around lateral margins of head; isopods may or may not be able to conglobate.....**3**

3 Flagellum of antenna with 2 or 3 articles; head without large anterolateral lobes.....**4**

– Flagellum of antenna with 4 articles; head with very large, distinctly produced anterolateral lobes, each lobe broad and truncate at tip .....**7**

4 Flagellum of antenna with 2 articles; dorsal surface of body covered with fine, but distinct scales (Fig. 42C) .....***Niambia capensis***

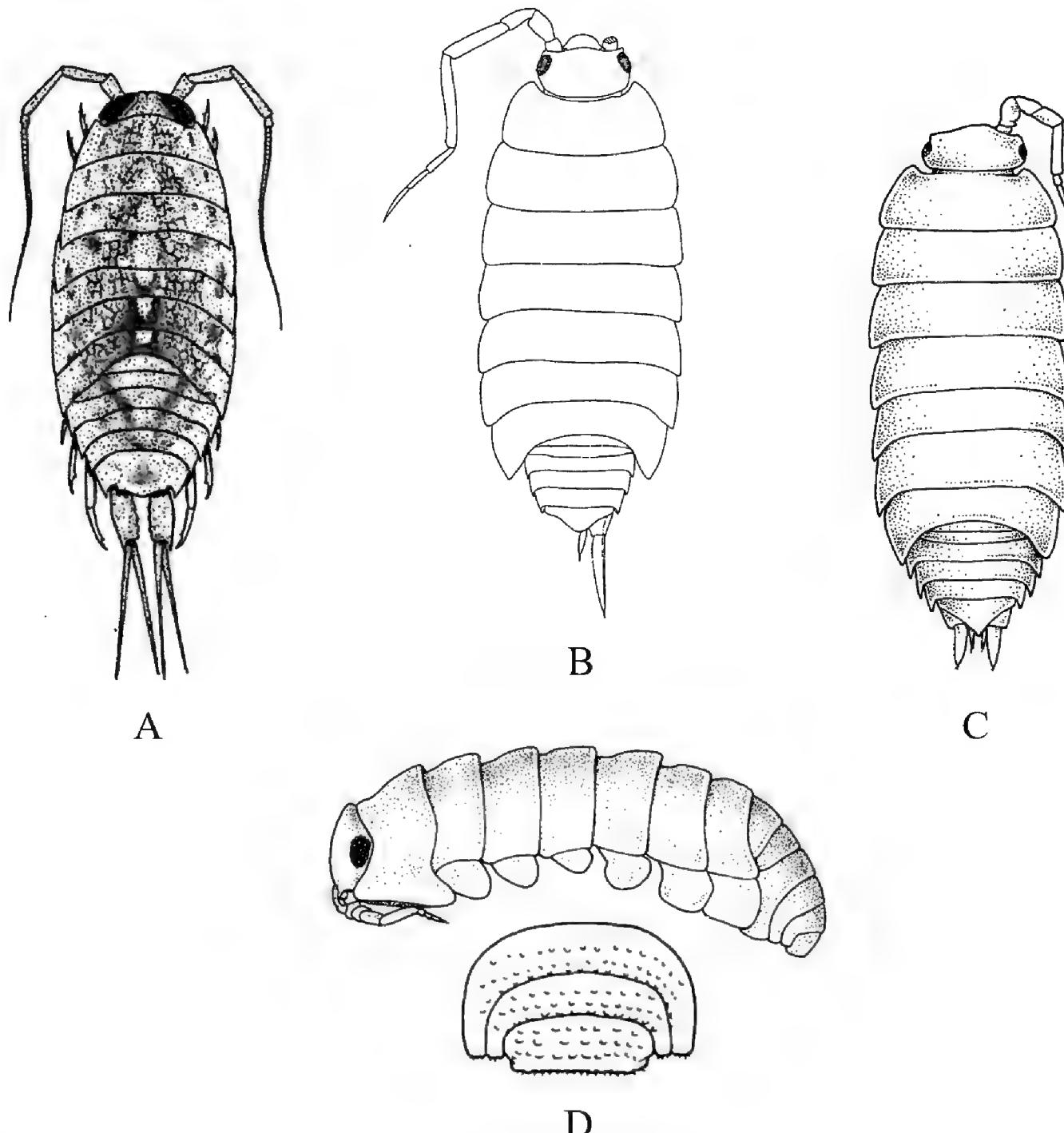
– Flagellum of antenna with 3 articles; dorsum without distinctly visible scales .....**5**

5 Head with small, forward protruding cone-shaped lobes situated just anterior to eyes; frontal margin of head produced into blunt median lobe; pleon not abruptly narrower than pereon.....**6**

– Head without cone-shape lateral lobes anterior to eyes; frontal margin of head slightly sinuous, but not produced into median lobe; pleon abruptly narrower than pereon (Fig. 42B) .....***Littorophiloscia richardsonae***

6 Uropodal protopod with rounded and expanded posterolateral margins (Fig. 43A) .....***Alloniscus mirabilis***

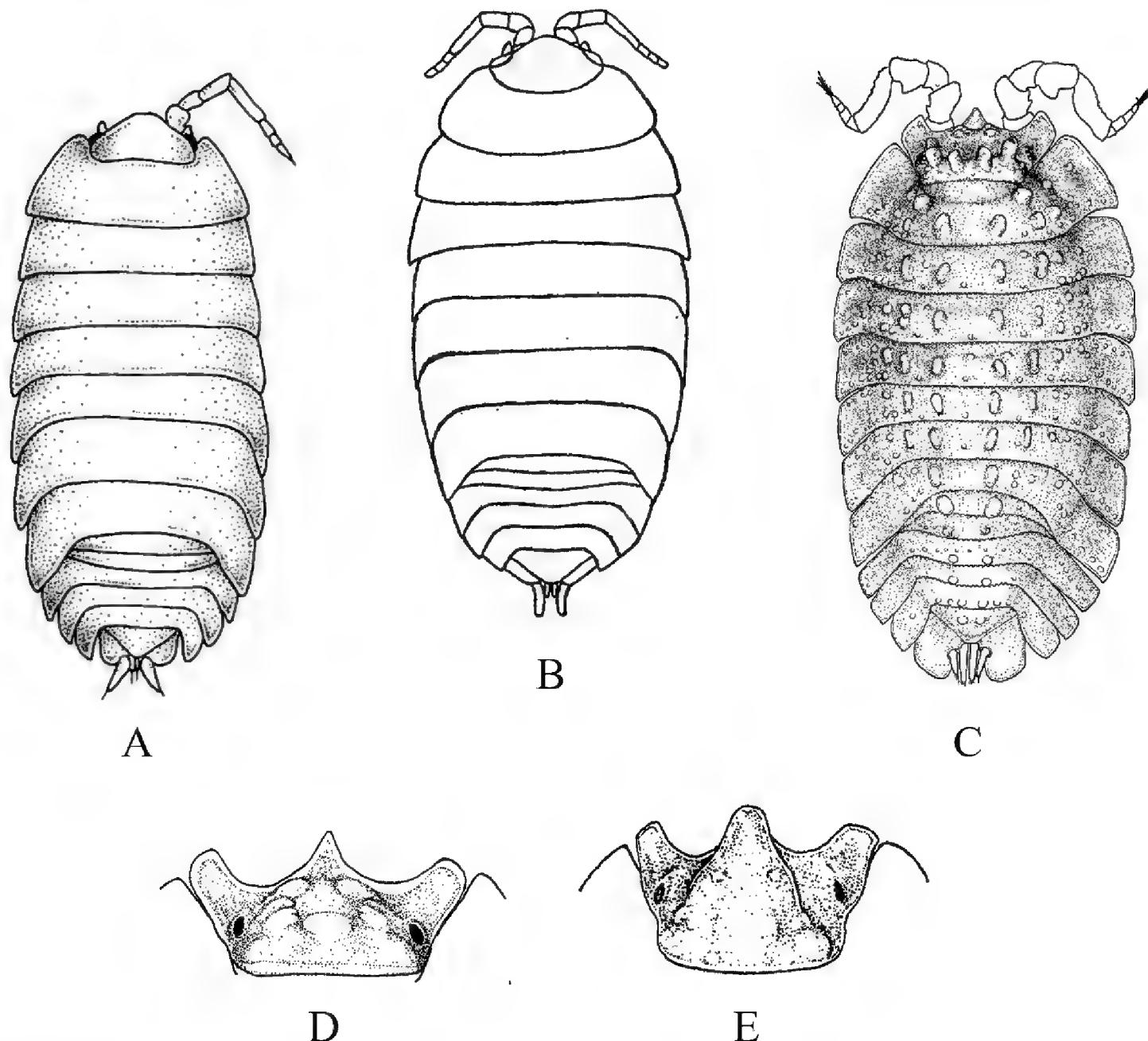
– Uropodal protopod with oblique posterolateral margins, not produced (Fig. 43B) .....***Alloniscus perconvexus***



**Figure 42.** Isopoda, Oniscidea, Oniscoidea, Ligiidae: **A** *Ligia occidentalis* (representative species for *Ligia* cf. *occidentalis*; after Allen 1976). Halophilosciidae: **B** *Littorophiloscia richardsonae* (after Brusca et al. 2007). Platyarthridae: **C** *Niambia capensis* (after Brusca et al. 2007). Tylidae: **D** *Tylos punctatus*, lateral view of whole body with posterior view of pleonites 4 and 5 plus pleotelson (after Brusca et al. 2007).

7 Anterior margin of head produced into strong, truncate median lobe; body markedly convex and capable of conglobation (Fig. 43E) ..... ***Armadilloniscus lindahli***  
 – Anterior margin of head produced into sharply acute median lobe; body not markedly convex and not capable of conglobation ..... **8**

8 Dorsal surface of body covered with large, elevated tubercles best developed on head; posterior border of all body segments except pleotelson appear beaded with minute, evenly spaced tubercles; antennal peduncle article 4 with spur-like process on lateral margin (Fig. 43C) ..... ***Armadilloniscus coronacapitalis***  
 – Dorsal surface of body rough, with low, rounded tubercles; posterior border of all body segments smooth; antennal peduncle article 4 without spur-like process on lateral margin (Fig. 43D) ..... ***Armadilloniscus holmesi***



**Figure 43.** Isopoda, Oniscidea, Oniscoidea, Alloniscidae: **A** *Alloniscus mirabilis* (after Brusca et al. 2007) **B** *Alloniscus perconvexus* (after Richardson 1905a). Detonidae: **C** *Armadilloniscus coronacapitalis* (after Menzies 1950c) **D** *Armadilloniscus holmesi* (after Menzies 1950c) **E** *Armadilloniscus lindahli* (after Menzies 1950c).

## Endnotes

1. The provisional species Sphaeromatidae sp. A listed in SCAMIT (2021) was reported based on immature female specimens collected off Catalina Island at a depth of 12–16 m. Although these isopods co-occurred with two other sphaeromatids, *Dynamenella glabra* and *Paracerceis sculpta*, they differed from females of both species as well as other known members of those two genera (but see Endnote 17 below regarding the correct generic assignment for some SCB *Dynamenella*). Although the voucher sheet developed for Sphaeromatidae sp. A included a note that these isopods could be immature *Paracerceis gilliana*, this hypothesis has not been confirmed. Consequently, this provisional species is not included in Key G because its correct generic assignment is not known. The second species listed in SCAMIT (2021) not included in this review is the oniscid *Armadillidium vulgare*, which is a strictly terrestrial species with a worldwide distribution.

2. No illustrations exist for the provisional anthuroid *Eisothistos* sp. A collected from Santa Barbara to Catalina Island at depths of 5–77 m, although Brusca and Cadien (1993) stated that the species is similar in gross morphology to *Eisothistos antarcticus* (see Wägele 1984a: fig. 2). However, neither *E. antarcticus* nor any of the other 30 species of *Eisothistos* currently recognized by WoRMS (Boyko et al. 2008 onwards) are known to occur near the SCB. For additional information on the genus see Wägele (1979, 1984a), Müller (1990), Poore (2001a), and Poore and Lew Ton (2002).

3. The aegid *Aegiochus plebeia* has not yet been reported from the SCB. However, the species is included in this guide since its known geographic range spans the region. See Brusca (1983a) and Bruce (2009a) for additional information.

4. It is currently unclear how to clearly distinguish juveniles of most cymothoid species from each other. Although Brusca (1978a, 1978b) provided detailed descriptions of the life histories of *Elthusa vulgaris* (as *Lironeca vulgaris*) and *Nerocila acuminata* (as *N. californica*), such information is not readily available for other local cymothoid species. Consequently, all juvenile cymothoids are treated as unidentified Cymothoidae in Key C.

5. Since its description in 1980, the cymothoid *Renocila thresherorum* has been considered primarily a Gulf of California species with only a few known records from elsewhere in the Eastern Pacific (see Brusca 1981). These include one SCB record of a female and an associated juvenile collected off Corona del Mar in southern California plus a couple of records from Magdalena Bay on the southwest coast of Baja California. The species, however, has also been reported recently from the Suez Canal area of Egypt (e.g., Eman et al. 2014; Mahmoud et al. 2016; Ali and Aboyadak 2018). Given this disjunct distribution, it would be useful to perform a comprehensive morphological and molecular comparison of Eastern Pacific vs. Egyptian specimens to confirm whether they represent the same or perhaps two similar looking species of *Renocila*.

6. The cymothoid *Ceratothoa gaudichaudii* is included in this guide based on historical distribution records (e.g., Brusca 1981). However, the species is listed as “taxon inquirendum” in WoRMS (Boyko et al. 2008 onwards) based on the review by Martin et al. (2015). Also see Hadfield et al. (2016) for a current list of accepted species in *Ceratothoa* Dana, 1852, and for information regarding taxonomic uncertainties within the genus.

7. Female and juvenile gnathiids key only to family in Key D. However, Haney (2006) provides a comprehensive discussion and guide to pairing unidentifiable females and juveniles with their male counterparts for many of the northeast Pacific species of *Gnathia* Leach, 1814 and *Caecognathia* Dollfus, 1901.

8. No illustrations exist for the three provisional species of gnathiids included in Key D (*Caecognathia* sp. A, *Caecognathia* sp. SD1, *Gnathia* sp. MBC1). However, photographs of these and all other known species of gnathiids that occur in SCB waters are available in Haney (2006).

9. The provisional species *Capitetragonia* sp. A was originally reported in 2011 as *Probopyria* sp. A (species voucher sheet available from SCAMIT Toolbox

at <https://www.scamit.org>; T. D. Stebbins, 4 September 2011). However, the genus *Probopyria* Markham, 1985 was synonymized with *Capitetragonia* Pearse, 1953 by An et al. (2015). Because no illustrations exist for this provisional species, an image of the type species of *Capitetragonia*, *C. alphei* (Richardson, 1900), is provided as an example in Fig. 15B.

10. The bopyrid *Eremitione giardi* is listed in SCAMIT (2021) as *Pseudione giardi*, although this and eight other species previously included in *Pseudione* were transferred to the newly erected genus *Eremitione* by Williams et al. (2019). This species was originally added to the SCAMIT species list in 2011 (Edition 6) based on a trawl record from off the coast of Palos Verdes (D. Cadien, pers. comm.). However, the record may be questionable because *E. giardi* was not previously known from California waters (see Markham 1974b) except possibly for a report of an unconfirmed species identified as *Pseudione* sp. found infesting the hermit crab *Pagurus hirsutusculus* in central California (J. Markham, pers. comm.). The record of *E. giardi* off Palos Verdes is likely valid if the host was a hermit crab, but not if the host was another type of crustacean (J. Markham, pers. comm.).

11. Two different adult body morphologies have been described for the dajid isopod *Holophryxus alaskensis* (see Richardson 1905a, 1905b; Butler 1964; Boyko and Williams 2021b), while Coyle and Mueller (1981) provided complete descriptions of the larval and juvenile stages of the species. In the original species description based on three adult female specimens collected off Alaska without any host information, Richardson (1905b) described and illustrated a stout and somewhat irregular body form, the dorsal and ventral views which are reproduced in Fig. 16A herein. Richardson (1908) later described a second species of the genus, *H. californiensis*, based on one adult female collected off Alaska attached to the shrimp *Pasiphaea pacifica*, plus one female and one male collected off Santa Barbara, southern California. In his subsequent redescription of *H. alaskensis* based on Richardson's type material and additional specimens of both sexes from British Columbia, Butler (1964: figs 1, 3) synonymized *H. californiensis* with *H. alaskensis* and described a more typical elongate and symmetrical body form for adult females. Additionally, Boyko and Williams (2021b) recently provided a thorough review of the above with new records that extended the southern distribution of *H. alaskensis* to deep waters off the US-Mexico border. These authors also provided color photographs of typical female and male *H. alaskensis*, as well as an in-situ photo of an adult female attached to its host shrimp (Boyko and Williams 2021b: fig. 1).

12. Specimens of unidentified dajid isopods listed as *Zonophryxus* sp. in SCAMIT (2021) were collected in SCB waters during the 1990s parasitizing two species of caridean shrimp, *Pantomus affinis* and *Plesionika trispinus* (see Montagne and Cadien 2001; Boyko and Williams 2021a). Whether these isopods represent one or more species awaits further investigation. Because no illustrations exist for *Zonophryxus* sp., images of a recently described species from Peruvian waters, *Zonophryxus probisowa* Boyko & Williams, 2021, are provided in Fig. 16B as an example of the genus. Although it

is not clear how closely this species resembles the SCB specimens, these images clearly show the notched appearance of the posterior end that is characteristic of species of *Zonophryxus*. In addition to describing *Z. probisowa*, Boyko and Williams (2021a) reviewed and provided a key to all seven species of *Zonophryxus* based on female characters. Finally, a couple of other eastern Pacific specimens of *Zonophryxus* recently discovered from mis-identified Gulf of California samples collected during the Talud VIII cruises in 2005 (TDS, pers. obs.) may represent an additional undescribed species of this genus (C. Boyko, pers. comm.).

13. There may be a new species of *Heteroserolis* in deeper waters of the SCB. Preliminary comparisons of specimens collected from depths  $> 100$  m off San Diego with those from shallower waters in San Diego Bay (depth  $\leq 15$  m) reveal several differences in morphology. Whether these differences merit a new species requires further investigation. The differences between the shallow-water and deep-water specimens include:

- Deep-water specimens have a much larger dorsal carina than do shallow-water animals. This is like differences described by Hessler (1972) between *H. mgrayi* (like deep-water specimens) and *H. carinata* (like San Diego Bay specimens).
- Deep-water specimens have a rather shallow lateral notch on the pleotelson that does not form a well-defined tooth (like described for *H. tropica* and *H. mgrayi*), while shallow-water animals have the distinct tooth or deep notch characteristic of *H. carinata*.
- Pereonites 5 and 6 are subequal in width to pereonite 4 in the deep-water animals (the lateral margins are nearly continuous with a gradual tapering to the pleotelson). In contrast, there is a distinct narrowing of the pereon between pereonites 4 and 5 in the shallow-water animals. This difference in shape appears distinct even in juveniles.

14. Two species of the sphaeromatoid genus *Ancinus* H. Milne Edwards, 1840 are reported herein as occurring in the SCB, including *A. granulatus* Holmes & Gay, 1909 and *A. seticomvus* Trask, 1971. Although Schultz (1973) considered *A. seticomvus* a junior synonym of *A. granulatus* as it has been listed by SCAMIT (1998–2021) and Brusca et al. (2007), Glynn and Glynn (1974) disputed Schultz's assessment and provided a detailed suite of characters by which to distinguish the two species. Consequently, most subsequent workers have recognized *A. seticomvus* as a valid species (e.g., Dexter 1976; Iverson 1982; Pires 1987; McLaughlin et al. 2005; Rocha-Ramírez et al. 2010) as currently accepted by WoRMS (i.e., Boyko et al. 2008 onwards).

15. Although the sphaeromatid *Gnorimosphaeroma oregonense* is included in the SCAMIT (2021) list of SCB species, Wetzer et al. (2021), in their recent redescription and assessment of the species and genus, could only verify its range from Alaska to San Francisco, California. Thus, the presence of *G. oregonense* south of central California is questionable, and any specimens encountered should be carefully examined. While *G. oregonense* is a fully marine species, the other species of the genus in SCB waters included in this review, *G. noblei*, occurs in brackish or freshwater habitats. In addition to habitat differences, these two species can best be distinguished

by the shape of their coxal plates as indicated in the key. See Wetzer et al. (2021: fig. 15) for SEM comparisons of the coxae of *G. oregonense* and *G. noblei*. Finally, although *Gnorimosphaeroma insulare* (Van Name, 1940) has been reported from the SCB, it is not included in this guide since it is only known from a freshwater pond on San Nicolas Island and is therefore not a marine species (see Wetzer et al. 2021 for additional details).

16. Even though the couplet in Key G identifying the sphaeromatid *Paracerceis sculpta* distinguishes between male and female characteristics, it does not account for differences between the three discrete male morphs of the species described in Shuster (1987). The male traits specified in the key represent those of the larger and more elaborate alpha-males that attract females to the spongocoels of calcareous sponges where mating and brooding of young occurs. Alpha-males are characterized by elongated uropods and highly sculptured pleotelsons as indicated in the key. Smaller beta-males lack such ornamentation and resemble females of *P. sculpta*, while tiny gamma-males resemble immature juveniles. All three male morphs, however, possess well-developed secondary sex characters (penes and appendix masculina) and are sexually mature. See Shuster (1987, 1992), Shuster and Wade (1991a, 1991b), and Shuster and Guthrie (1999) for additional information on the reproductive biology and ecology of *P. sculpta*, and the relationship between alpha, beta, and gamma males.

17. The sphaeromatids *Dynamenella dilatata* and *Dynamenella glabra* as treated herein and in SCAMIT (2021) are instead classified in the genus *Dynamene* Leach, 1814 in both WoRMS (Boyko et al. 2008 onwards) and Wall et al. (2015), although listed as “taxon inquirendum” or “correct generic placement uncertain,” respectively. Thus, the correct generic assignment for these two species is currently in question. Based on molecular data, Wetzer et al. (2018) demonstrated that *Dynamene* and *Dynamenella* are not closely related (i.e., occurring in *Cerceis* and *Dynamenella* clades, respectively). Morphological revisions based on adult males are needed to be able to correctly place these species.

18. Species of the sphaeromatid genus *Exosphaeroma* Stebbing, 1900 have either a 1:1 male to female ratio in which males are observed to mate guard an individual female or a highly skewed sex ratio where adult males guard harems and are very rare relative to females and subadults. In the SCB, *E. inornata* exhibits the first of these mating patterns with individual male/female pairs. Both sexes in this species are similar in general appearance, are unornamented, and have uropodal endopods in which the posterior margin is evenly rounded. Alternatively, in the *E. amplicauda*-like species (*E. amplicauda*, *E. aphrodita*, and *E. pentcheffi*) treated herein in which males guard harems of females, the adult males are characterized by a pleotelson to overall body length ratio of 0.30 or greater, a pleotelson with an acuminate posterior border, and uropodal endopods in which the posterior margins are falcate. A review of *Exosphaeroma* from the north-eastern Pacific evaluated the status of *E. amplicauda* and *E. aphrodita* and described an additional three new species (Wall et al. 2015). A neotype of *E. amplicauda* was designated and the

species redescribed based on the neotype and topotypic specimens. As a result of this study, the distribution of *E. amplicauda* was restricted to northern California along the coasts of Marin, Sonoma, and San Mateo Counties. In contrast, *E. aphrodita* originally described from La Jolla (San Diego County) and previously considered a *nomen dubium* was taken out of synonymy and revalidated by Wall et al. (2015) as a SCB species. Additionally, the new species *E. pentcheffi* was described from intertidal samples collected at Point Fermin (Los Angeles County). These authors are also aware that there are likely other undescribed species of *Exosphaeroma* occurring in the Channel Islands within the SCB, with specimens from Santa Catalina Island being genetically closely related to *E. pentcheffi* (RW, pers. obs.). The *E. amplicauda*-like species along the western coast of North America have been previously lumped and unrecognized, in part because original descriptions were not detailed and the best drawings available were those of Kussakin (1979). However, Kussakin's material was based on specimens collected from Amchitka Island, Alaska, some 2000 km north of the type locality of *E. amplicauda* near San Francisco. Consequently, Kussakin's specimens probably also represent an undescribed species.

19. Even though the sphaeromatid *Exosphaeroma rhomburum* is an accepted species in WoRMS (Boyko et al. 2008 onwards) and is reported in SCAMIT (2021), Wall et al. (2015) designated the species *incertae sedis* in their recent treatment of north-eastern Pacific *Exosphaeroma*. This was due in part to the brief original description provided by Richardson (1899: as *Sphaeroma rhomburum*), in which she only described and figured the pleon, pleotelson, and uropods in any detail. Although a figure of the maxilliped was also presented, Richardson (1899) provided no accompanying description of the structure. Richardson (1899) also did not specify the sex of either of the two specimens she examined, both of which were collected in central California (Monterey Bay). Because of the above and the lack of confirmed males known to them at the time, Wall et al. (2015) were unable to further evaluate the status of the species, thus resulting in their *incertae sedis* designation. As part of the present study, however, we were able to examine specimens of both male and female isopods attributed to *E. rhomburum* and confirm its validity as a distinct species without any significant sexual dimorphism. On the other hand, we question whether the species actually belongs in *Exosphaeroma* because it appears to differ noticeably in morphology from other species of the genus. In her original description and subsequent work, Richardson (1899, 1905a) also noted that the species was “similar to *S. egregium* Chilton” (= *Sphaeroma egregia* Chilton, 1892), a species now placed in the southern hemisphere genus *Cymodocella* Pfeffer, 1887 (see Harrison and Holdich 1982; Bruce 1995). Based on a cursory review of some *Cymodocella* specimens available to us, we agree that *E. rhomburum* appears to resemble that genus more closely than it does *Exosphaeroma*. However, it will require further morphological and preferably molecular studies to confirm whether the species should be reassigned to *Cymodocella* or another existing or perhaps new

genus. Finally, we extend the southern distribution of *E. rhomburum* to NW Baja California based on our examination of specimens collected by the City of San Diego's Ocean Monitoring Program, while the northern range limit is extended herein to Washington State, USA based on observations reported by Lafferty and Suchanek (2016).

20. Three species of the valviferan genus *Idarcturus* Barnard, 1914 are reported herein as occurring in the SCB. Of these, *I. allelomorphus* is the most common, occurring in soft-bottom continental shelf sediments at depths < 100 m from central California to Baja California Norte (see Menzies and Barnard 1959; Wetzer and Brusca 1997; Campos and Villarreal 2008). A second species, *I. hedgpethi*, was long known from only northern California where it was collected in 1948 living on hydroids in the low intertidal (see Menzies 1951b). Although *I. hedgpethi* was added to the SCAMIT species list in 2008 (Edition 5), we have been unable to confirm the source of that record. One record of *I. hedgpethi* was reported from Port Hueneme (Ventura County, southern California) during the 2000 and 2001 surveys of California bays and harbors (Fairey et al. 2002), but it is unknown whether that record was the source of the listing in SCAMIT (2008). The species was also reported from much further north in the Strait of Georgia, British Columbia by Macdonald et al. (2010). If accurate, these last two records expand the geographic range of *I. hedgpethi* from the northern California type locality to span ~ 1700 km from British Columbia to the SCB. Although *I. hedgpethi* was also recently reported from soft-bottom benthic sites located near the northern Channel Islands during the Bight 2013 regional monitoring project (Gillett et al. 2017), those specimens likely represent an undescribed species of *Idarcturus* that was first observed in the region during the previous Bight 2008 regional project (TDS, pers. obs.), but which was lumped together with *I. allelomorphus* in the project's final report (i.e., Ranasinghe et al. 2012). Although the Bight 2008 specimens were initially thought to resemble *I. hedgpethi* in terms of their pronounced spination pattern, subsequent observations demonstrated that they clearly do not represent that species. Although it is possible that the Bight 2008 and Bight 2013 specimens of *Idarcturus* collected near the Channel Islands may turn out to be a more spinous form of *I. allelomorphus*, this appears unlikely based on preliminary results of ongoing investigations. Consequently, we have designated these specimens as *Idarcturus* sp. A in this review.

21. *Edotia* sp. B is currently being described by TD Stebbins and R Wetzer (unpublished results, manuscript in preparation). This paper also includes a redescription of *E. sublittoralis* with a global review of the distribution and ecology of the genus.

22. The three species of *Synidotea* characterized by an apically rounded or spatulate pleotelson (*S. calcarea*, *S. magnifica*, and *S. media*) that occur in SCB waters are difficult to distinguish using the existing literature (e.g., Menzies and Barnard 1959; Schultz 1966; Iverson 1972; Menzies and Miller 1972; Wetzer and Brusca 1997). The problem is primarily due to an incomplete original description of *S. magnifica*. For a more detailed discussion of the issue and its resolution, see Stebbins (2012a).

23. The idoteid isopods *Idotea fewkesi*, *I. rufescens*, and *I. urotoma* included in the SCB fauna were listed in the genus *Pentidotea* in SCAMIT (2021). Although Poore and Lew Ton (1993) provided a more restrictive diagnosis of the genus *Idotea* while also raising *Pentidotea* to full generic status, they did not recommend that species previously assigned to *Idotea* be transferred to *Pentidotea* or vice versa. Consequently, species formerly assigned to the subgenera *Idotea* and *Pentidotea* were placed in the genera *Idotea* and *Pentidotea*, respectively, as is currently accepted in WoRMS (see Boyko et al. 2008 onwards). Although the proper affinities of some species of *Idotea* such as *I. fewkesi* and *I. urotoma* are uncertain at this time due to the more restrictive generic diagnosis as pointed out by Poore and Lew Ton (1993), reassignment of any of these species to *Pentidotea* or another existing or new genus awaits further investigation.

24. *Janiralata rajata* and *Janiralata* sp. D may be difficult to distinguish unless comparing actual specimens of both species. For example, Wilson (1997) stated that *Janiralata* sp. D differs from *J. rajata* as follows: “the eyes are smaller, the body has numerous dense chromatophores, the antennula is longer, and the propodus of pereopod I has more proximoventral denticles (18 instead of 12 or 13).” Another possible difference is that *Janiralata* sp. D has only been reported from continental shelf waters deeper than 90 m in the Santa Maria Basin, while *J. rajata* is reported from shallower waters < 40 m deep from central to southern California.

25. Although no illustrations exist of the provisional asellote species *Pleurocope* sp. A, the SCAMIT voucher sheet for the species compares it to another provisional species of the same name in manuscript (i.e., *Pleurocope* sp. A Wilson MS), as well as to three of the other four recognized species of the genus (voucher sheet for *Pleurocope* sp. IS1 available from SCAMIT Toolbox at <https://www.scamit.org>; D. B. Cadier, 4 March 2012). These three species include *P. dasyura* from the Mediterranean, *P. floridensis* from the tropical western Atlantic, and *P. wilsoni* from Thailand and Aldabra. The fourth species, *P. iriomotensis*, is from Japan. An image of *P. floridensis* modified after Kensley and Schotte (1989: fig. 43B) is provided in Fig. 35E herein as an example of the genus.

26. Just and Wilson (2021) recently redescribed the SCB asellote *Munnogonium tillerae* (Menzies & Barnard, 1959) in their review of several species in the ‘*Austrosignum-Munnogonium*’ complex sensu Just and Wilson (2007). In doing so, these authors compared *M. tillerae* collected off San Diego to *Munnogonium erratum* (Schultz, 1964) known only from the type locality off Santa Barbara County, as well as to specimens identified as *Munnogonium* cf. *tillerae* in Wilson (1997) that were also collected off Santa Barbara in the Santa Maria Basin. As a result of their comparisons, Just and Wilson (2021) concluded that the San Diego and Santa Barbara specimens represent distinct species, and they therefore restricted *M. tillerae* to occurring just off San Diego. Although these authors reported that “the type of *M. erratum* has been destroyed,” they also stated that the specimens of *Munnogonium* cf. *tillerae* studied by Wilson (1997) were collected near that type locality and at around the same depth. Thus, Just and Wilson (2021) used the features of *M. cf. tillerae* described in Wilson (1997) as *M. erratum* in their accompanying key to species of *Munnogonium* (G Wilson, pers. comm.). This treatment is followed in this paper, with *M. tillerae*

restricted to the San Diego region and *M. erratum* considered synonymous with *M. cf. tillerae* from the Santa Maria Basin (i.e., Fig. 35C herein was reproduced from Wilson 1997: fig. 1.28).

27. The provisional asellote species *Microcharon* sp. A was originally assigned to the family Microparasellidae as listed in SCAMIT (2021). However, this genus was transferred to the family Lepidocharontidae by Galassi et al. (2016). Although no complete illustrations exist for *Microcharon* sp. A, the species is similar in general appearance to the Caribbean species *Microcharon sabulum* Kensley, 1984. Thus, an image of *M. sabulum* is provided in Fig. 39C as an example of the genus.

28. No illustrations exist for the SCB asellotes *Caecianiopsis* sp. LA1 and *Caecianiopsis* sp. LA2. However, these two provisional species are similar in general morphology to the type species of the genus from northern California, *Caecianiopsis psammophila* Menzies & Petit, 1956. Thus, an image of *C. psammophila* is provided in Fig. 39B herein as an example of the genus.

29. No illustrations exist for the provisional species *Paramunna* sp. SD1 collected during the Bight 2003 regional monitoring project (see Ranasinghe et al. 2007). Thus, the species can presently be distinguished from the other SCB species of *Paramunna* only by the characters in Key I.

30. Hurtado et al. (2010) and Eberl et al. (2013) presented fine-scale phylogeographic studies of *Ligia* populations distributed from central California to central Mexico, including the Gulf of California, describing several highly divergent lineages. Their conclusions suggest the presence of multiple *Ligia* species spanning this region, including at least one unnamed species that ranges throughout the SCB from south of Point Conception to NW Baja California, including the Channel Islands, as well as perhaps further south along the Baja peninsula. This species corresponds to the “Baja Pacific-Southern California” clade of Hurtado et al. (2010) and is referred to in this guide as *Ligia* cf. *occidentalis*.

## Annotated list of species

### **Suborder Cymothoida**

#### **Superfamily Anthuroidea**

##### **Family Antheluridae**

*Ananthura luna* (Schultz, 1966) [Fig. 6E] Continental shelf, slope, and submarine canyon benthos (78–1298 m); Santa Monica Bay, Tanner Canyon, La Jolla, and Coronado canyons, southern California, USA. Type locality: USA, California, Tanner Canyon (R/V Velero IV Station No. 6832-60; 32°33'36"N, 118°55'40"W). Body length to ~ 21 mm. See Schultz (1966 original description as *Bathura luna*; 1969, 1977), Kensley (1978), Poore and Lew Ton (1988d), Wetzer et al. (1991), Cadien and Brusca (1993), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), Ranasinghe et al. (2007), SCAMIT (2008–2021), Espinosa-Pérez et al. (2009), and Gillett et al. (2019).

## Family Anthuridae

*Amakusanthura californiensis* (Schultz, 1964) [Fig. 6A] Continental shelf (depth to at least 80 m); Santa Maria Basin/Western Santa Barbara Channel, southern California, USA to Guadalupe Island off western Baja California Norte, Mexico. Type locality: USA, California, Los Angeles County, 9.9 mi SSW of Santa Monica Pier (R/V Velero IV Station No. 2998-55;  $33^{\circ}53'22''N$ ,  $118^{\circ}34'40''W$ ). Body length to ~ 11 mm. See Schultz (1964 original description as *Apanthura californiensis*; 1969), Lissner et al. (1986), Poore and Lew Ton (1988b), Wetzer et al. (1991), Cadien and Brusca (1993), SCAMIT (1994–2021), Wetzer and Brusca (1997), Ranasinghe et al. (2003, 2007, 2012), McLaughlin et al. (2005), and Espinosa-Pérez and Hendrickx (2006).

*Cyathura munda* Menzies, 1951 [Fig. 6B] Low intertidal to continental shelf, on kelp holdfasts to deep-water rocks (0–132 m); Marin County, northern California, USA to NW Baja California, Mexico, and the Gulf of California. Type locality: USA, California, Marin County, Tomales Point, Tomales Bluff (reef). Body length to ~ 6 mm. See Menzies (1951b), Menzies and Barnard (1959), Schultz (1964, 1969), Miller (1975), Kussakin (1982), Lissner et al. (1986), Wetzer et al. (1991), Cadien and Brusca (1993), SCAMIT (1994–2021), Chess and Hobson (1997), Wetzer and Brusca (1997), Espinosa-Pérez and Hendrickx (2001a, 2006), McLaughlin et al. (2005), and Gillett et al. (2017).

*Haliophasma geminatum* Menzies & Barnard, 1959 [Fig. 6C] Continental shelf, slope, and submarine canyon benthos (9–512 m); Strait of Georgia, British Columbia, Canada to San Quintin Bay, Baja California Norte, Mexico. Type locality: USA, California, off San Mateo Point (R/V Velero IV Station No. 4771-56;  $33^{\circ}21'40''N$ ,  $117^{\circ}35'50''W$ ). Body length to ~ 8 mm. See Menzies and Barnard (1959 original description as *Haliophasma geminata*; gender of specific name corrected to *geminatum* in Boyko et al. 2008 onwards), Menzies (1962a), Schultz (1964, 1966, 1969), Lie (1968), Iverson (1974), Poore (1975), Gillard (1978), Lissner et al. (1986), Poore and Lew Ton (1988a), Wetzer et al. (1991), Cadien and Brusca (1993), Thompson et al. (1993), SCAMIT (1994–2021), Wetzer and Brusca (1997), Bergen et al. (1998, 2001), Smith et al. (2001, 2003), Ranasinghe et al. (2003, 2007, 2012), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), Campos and Villarreal (2008), Macdonald et al. (2010), Puget Sound Institute (2012–2023), Gillett et al. (2017, 2019, 2022), and Henkel et al. (2020).

*Mesanthura occidentalis* Menzies & Barnard, 1959 [Fig. 6D] Low intertidal to shallow water, on kelp and rocks (0–20 m); Point Conception, southern California, USA to Baja California and the Gulf of California, Mexico, and to the Gulf of Nicoya, Costa Rica. Type locality: California, 11 miles east of Point Conception (R/V Velero IV Station No. 4822-57;  $34^{\circ}27'15''N$ ,  $120^{\circ}14'45''W$ ). Body length to ~ 7 mm. See Menzies and Barnard (1959), Schultz (1964, 1969), Allen (1976), Wägele (1984b), Wetzer et al. (1991), Cadien and Brusca (1993), Chess and Hobson (1997), Espinosa-Pérez and Hendrickx (2001a), McLaughlin et al. (2005), Campos and Villarreal (2008), and SCAMIT (2012–2021).

## Family Expanathuridae

*Eisothistos* sp. A [No figure] Inner to mid shelf offshore habitats collected off rocks and the coral *Coenocyathus bowersi* (5–77 m); southern California, USA from Tajiguas, Santa Barbara County and Catalina Island. Body length of juveniles to ~ 2.5 mm (i.e., adults not known). See Cadien and Brusca (1993) and SCAMIT (2013–2021). Note: See Endnote 2.

## Family Hyssuridae

*Kupellonura* sp. A [Fig. 6F] Continental shelf, hard bottom benthos (105–117 m); Santa Maria Basin offshore of Purisima Point, Santa Barbara County, California, USA (~ 35 km north of SCB northern boundary). Body length = no information available. See Wetzer and Brusca (1997: 19–20, fig. 1.7, description and figure) and SCAMIT (2008–2021).

## Family Paranthuridae

*Califanthura squamosissima* (Menzies, 1951) [Fig. 5C] Intertidal to offshore continental shelf and bays, in kelp and eelgrass beds, and on muddy or sandy sediments (0–142 m); Dillon Beach, northern California, USA to Oaxaca, Mexico, and the Gulf of California. Type locality: USA, California, Marin County, Tomales Point, Tomales Bluff. Body length to ~ 5.6 mm. See Menzies (1951b original description as *Colanthura squamosissima*), Menzies and Barnard (1959), Schultz (1969), Miller (1975), Brusca (1980), Kussakin (1982), Poore (1984b), Wetzer et al. (1991), Cadien and Brusca (1993), SCAMIT (1994–2021), Espinosa-Pérez and Hendrickx (2001a, 2006), McLaughlin et al. (2005), Brusca et al. (2007), Moore and Hovel (2010), Ranasinghe et al. (2012), Bastida-Zavala et al. (2013), Cruz-García et al. (2013), Gillett et al. (2017), and García-Madrigal et al. (2022).

*Colanthura bruscae* Poore, 1984 [Fig. 5D] Intertidal to shallow subtidal (0–27 m); San Clemente, southern California, USA to Salinas Bay, Costa Rica. Type locality: Mexico, Sonora, Puerto Peñasco, Station Beach Reef (on *Sargassum*; 31°20'N, 113°35'W). Body length to ~ 5.4 mm. See Poore (1984b), Wetzer et al. (1991), Cadien and Brusca (1993), Espinosa-Pérez and Hendrickx (2001a, 2006), McLaughlin et al. (2005), and Brusca et al. (2007).

*Paranthura elegans* Menzies, 1951 [Fig. 5A] Intertidal to subtidal, in low rocky intertidal, eelgrass beds, algal mats, muddy sediments, and pier pilings (0–55 m); Marin County, northern California, USA to San Quintin Bay, Baja California Norte, Mexico, and the Gulf of California. Type locality: USA, California, Marin County, Tomales Point, Tomales Bluff (reef). Body length to ~ 9.1 mm. See Menzies (1951b, 1962a), Menzies and Barnard (1959), Miller (1975), Brusca (1980), Kussakin (1982), Lissner et al. (1986), Wetzer et al. (1991), Cadien and Brusca (1993), SCAMIT (1994–2021), Bergen et al. (1998), Espinosa-Pérez and Hendrickx

(2001a, 2006), Ranasinghe et al. (2003, 2007, 2012), Smith et al. (2003), Healey and Hovel (2004), McLaughlin et al. (2005), Reed and Hovel (2006), Sirota and Hovel (2006), Brusca et al. (2007), and Melwani and Kim (2008).

*Paranthura japonica* Richardson, 1909 [Fig. 5B] Introduced Asian species that occurs in fouling communities and shallow-water marinas; worldwide distribution, including northern and southern Japan, eastern Russia, eastern China, southwestern France, and from northern to southern California, USA in North America. Type locality: Japan, Mororan. Body length to ~ 8.5 mm. See Richardson (1909), Kussakin (1982), Cohen and Carlton (1995), Cohen et al. (2005), Brusca et al. (2007), Ruiz et al. (2011), Lavesque et al. (2013), SCAMIT (2013–2021), and Gillett et al. (2017, 2022).

## Superfamily Cymothooidea

### Family Aegidae

*Aega lecontii* (Dana, 1854) [Fig. 8E] Continental shelf and submarine canyons (depth to at least 218 m), collected from fishes or soft-bottom habitats; central to southern California, USA. Type locality: USA, California. Body length to ~ 20 mm. See Dana (1854 original description as *Aegacylla lecontii*), Stimpson (1857), Richardson (1899, 1900b, 1905a), Hewatt (1946), Schultz (1966, 1969), Miller (1975), Kussakin (1979), Brusca (1983a), SCAMIT (2001–2021), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), Brusca et al. (2007), and Bruce (2009a). Note: Although Dana (1854) did not designate a specific type specimen or locality for *A. lecontii*, the specimen on which his original description was based is believed to be in the invertebrate zoology collections of the Yale Peabody Museum of Natural History (Catalog No. YPM IZ 000303.CR).

*Aegiochus plebeia* (Hansen, 1897) [Fig. 8F] Deep water off oceanic islands (688–2534 m); eastern Pacific (Aleutian Islands to Peru), western Pacific (Indonesia to Japan), and New Caledonia. Type locality (syntypes): Eastern Pacific off Cocos Island and Panama (Albatross Station No. 3363). Body length to ~ 37 mm. See Hansen (1897 original description as *Aega plebeia*), Richardson (1909 as *Aega magnoculis*), Birstein (1973), Brusca (1983a), Brusca and Iverson (1985), Bruce (2009a), Azofeifa-Solano and Cortés (2020), and Zúñiga Delgado et al. (2021). Note: See Endnote 3.

*Rocinela angustata* Richardson, 1904 [Fig. 9A] Continental shelf, slope, and basins (30–2534 m), collected from fishes or soft-bottom habitats; Bering Sea, Alaska, USA to Baja California, Mexico, and the Gulf of California. Type locality (lectotype): Bering Sea, USA, Alaska, NW of Unimak Island (54°48'50"N, 165°42'W). Body length to ~ 37.4 mm. See Richardson (1904a, 1905a), Hatch (1947), George and Strömberg (1968), Schultz (1969), Birstein (1973), Miller (1975), Lissner et al. (1986), Brusca and France (1992), SCAMIT (1994–2021), Wetzer and Brusca (1997), Smith et al. (2001), Espinosa-Pérez and Hendrickx (2002, 2006), McLaughlin et al. (2005), Moles (2007), Ranasinghe et al. (2007), Bruce (2009a), Macdonald et al. (2010), Gillett et al. (2017, 2019), and Henkel et al. (2020).

*Rocinela belliceps* (Stimpson, 1864) [Fig. 9B] Continental shelf and slope (shallow subtidal to 284 m), collected from fishes or soft-bottom habitats; Alaska, USA to western Baja California, Mexico, and the Gulf of California. Type locality (neotype): USA, Washington, San Juan Island. Body length to ~ 29.1 mm. See Stimpson (1864 original description as *Aega belliceps*), Richardson (1898, 1899, 1905a), Fee (1927), Hatch (1947), Schultz (1966, 1969), George and Strömberg (1968), Miller (1975), Allen (1976), Kussakin (1979), Brusca and France (1992), SCAMIT (1994–2021), Chess and Hobson (1997), Espinosa-Pérez and Hendrickx (2001a, 2002, 2006), McLaughlin et al. (2005), Moles (2007), Macdonald et al. (2010), Puget Sound Institute (2012–2023), and Ranasinghe et al. (2012).

*Rocinela laticauda* Hansen, 1897 [Fig. 9C] Continental shelf and slope (120–906 m), collected from fishes or soft bottom habitats; San Simeon, California, USA and Acapulco, Mexico. Type locality (lectotype): Mexico, off Acapulco. Body length to ~ 41.4 mm. See Hansen (1897), Richardson (1898, 1899, 1900b, 1905a), Schultz (1969), Brusca and France (1992), Espinosa-Pérez and Hendrickx (2001a, 2006), Bruce (2009a), and García-Madrigal et al. (2022).

*Rocinela murilloi* Brusca & Iverson, 1985 [Fig. 9D] Continental slopes and basins (700–1866 m), collected from fishes or soft-bottom habitats; Point Sur, California, USA to Arica, Chile. Type locality: Costa Rica, 14 miles 233°T from Point Guiones at the mouth of Golfo de Nicoya (9°45'N, 85°55'W). Body length to ~ 35 mm. See Brusca and Iverson (1985), Wetzer et al. (1991), Brusca and France (1992), Espinosa-Pérez and Hendrickx (2001a), Hendrickx (2008, 2018a), Bruce (2009a), and Azofeifa-Solano and Cortés (2020). Note: Although *R. murilloi* has also been listed as occurring in mangrove lagoons or estuaries in Baja California Sur (table 15.1 in Whitmore et al. 2005), we suspect that record may be erroneous as the species is otherwise known only from offshore waters of 700 m or deeper.

*Rocinela signata* Schioedte & Meinert, 1879 [Fig. 9E] Mostly intertidal to shallow subtidal in embayments and on the offshore continental shelf (0–68 m), collected from fishes or soft-bottom habitats; Humboldt Bay, northern California, USA to Baja California and the Gulf of California, Mexico, and south to Costa Rica, Panama, Colombia and Ecuador, including the Galapagos Islands in the eastern Pacific, and in the western Atlantic, Caribbean, and Gulf of Mexico from Florida, USA to northeastern Brazil. Type locality (lectotype): West Indies, St. Croix Island. Body length to ~ 20.6 mm. See Schioedte and Meinert (1879), Richardson (1898, 1905a), Menzies and Glynn (1968), Bowman (1977), Brusca and Iverson (1985), Garzón-Ferreira (1990), Brusca and France (1992), Espinosa-Pérez and Hendrickx (2001a, 2002, 2006), Brusca et al. (2004), McLaughlin et al. (2005), Bunkley-Williams et al. (2006), Lazarus-Agudelo and Cantera-Kintz (2007), Bruce (2009a), Cavalcanti et al. (2012), Bastida-Zavala et al. (2013), Pires-Vanin et al. (2014), Fogg et al. (2016), Cardoso et al. (2017), Shaughnessy et al. (2017), Aguilar-Perera et al. (2018), Ortiz and Lalana (2018), Alves et al. (2019), Silva et al. (2019), Aguilar-Perera (2022), Aguilar-Perera and Noh-Quiñones (2022), and García-Madrigal et al. (2022).

## Family Cirolanidae

*Cirolana diminuta* Menzies, 1962 [Fig. 7A] Intertidal to subtidal, on rocks, sandy silt sediments, algae, and member of the demersal zooplankton community (0–50 m); Point Conception, southern California, USA to western Baja California and Gulf of California, Mexico, and the Galapagos Islands. Type locality: Mexico, Baja California, Bahia de San Quintin. Body length to ~ 10.5 mm. See Menzies (1962a), Schultz (1969), Bruce and Bowman (1982), Stepień and Brusca (1985), Bruce (1986a), SCAMIT (1994–2021), Brusca et al. (1995, 2007), Chess and Hobson (1997), Espinosa-Pérez and Hendrickx (2001a), and McLaughlin et al. (2005).

*Cirolana harfordi* (Lockington, 1877) [Fig. 7B] Intertidal to shallow subtidal, abundant in mussel beds on rocky shores, also occurs in mangrove lagoons or estuaries at southern end of the range; Vancouver Island, Canada to Magdalena Bay, Baja California Sur, Mexico. Type locality (probable syntypes; see Brusca et al. 1995): USA, California, Santa Rosa Island. Body length to ~ 20 mm. See Lockington (1877b original description as *Aega harfordii*), Richardson (1899, 1900b, 1905a), Stafford (1913a), Shearer (1942), Hewatt (1946), Hatch (1947), George and Strömberg (1968), Schultz (1969), Miller (1975), Allen (1976), Johnson (1976a, 1976b), Gillard (1978), Kussakin (1979), Lee and Miller (1980), Bruce (1981), Ricketts et al. (1985), Brusca et al. (1995, 2007), Espinosa-Pérez and Hendrickx (2001a, 2002, 2006), McLaughlin et al. (2005), Whitmore et al. (2005), Campos and Villarreal (2008), SCAMIT (2011–2021), Roletto et al. (2014), Bugnot et al. (2015), Lafferty and Suchanek (2016), and Morales-Zarate et al. (2016).

*Eurydice caudata* Richardson, 1899 [Fig. 7C] Intertidal to continental shelf (0–160 m), and occasionally on fishes (e.g., California scorpionfish and longfin sanddab); San Diego, southern California, USA to western Baja California Sur and the Gulf of California, Mexico, and south to Ecuador, including the Galapagos and other offshore islands of the tropical eastern Pacific. Type locality: USA, California, Catalina Island, Isthmus Cove. Body length to ~ 9 mm. See Richardson (1899, 1900b, 1905a), Menzies and Barnard (1959 as *E. branchiopus*), Schultz (1966 as *E. branchiopus*; 1969 as both *E. branchiopus* and *E. caudata*), Bowman (1977), Brusca and Iverson (1985), Bruce (1986a), Hobson and Chess (1986), SCAMIT (1994–2021), Brusca et al. (1995, 2004, 2007), Espinosa-Pérez and Hendrickx (2001a, 2002, 2006), Smith et al. (2001, 2003), Ranasinghe et al. (2003, 2007, 2012), McLaughlin et al. (2005), Kalman (2006), Campos and Villarreal (2008), and Gillett et al. (2017, 2019, 2022). Note: If confirmed, the Gillett et al. (2019) record extends the maximum depth range of this species slightly from 160 m to the upper slope between 200–500 m.

*Excirolana chiltoni* (Richardson, 1905) [Fig. 7D] Intertidal on sandy beaches; British Columbia, Canada to southern California, USA, as well as Japan, Taiwan, and Hong Kong. Type locality: USA, California, San Francisco. Body length to ~ 13.2 mm. See Richardson (1905a original description as *Cirolana chiltoni*), Richardson (1912), Schultz (1969), Klapow (1972), Iverson (1974), Miller (1975), Kussakin (1979),

Bruce and Jones (1981), Dexter (1983), Bruce (1986a), Brusca et al. (1995, 2007), Kaneko and Omori (2005), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), Ranasinghe et al. (2007, 2012), SCAMIT (2011–2021), Gillett et al. (2017), and Shaughnessy et al. (2017).

*Excirolana linguifrons* (Richardson, 1899) [Fig. 7E] Intertidal on sandy beaches; Coos Bay, Oregon to southern California, USA. Type locality: USA, California, Monterey Bay. Body length to ~ 3.8 mm. See Richardson (1899 original description as *Cirolana linguifrons*; 1900b, 1905a, 1912), Shearer (1942), Schultz (1969), Miller (1975), Kussakin (1979), Bruce (1986a), Brusca et al. (1995, 2007), SCAMIT (2001–2021), Ranasinghe et al. (2003), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), and Campos and Villarreal (2008).

*Metacirolana joanneae* (Schultz, 1966) [Fig. 7F] Offshore submarine canyons and basins (218–500 m); Strait of Georgia, British Columbia, Canada to southern California, USA, including Santa Cruz Canyon. Type locality: USA, California, Santa Cruz Canyon (R/V Velero IV Station No. 6805-59; 33°35'59"N, 119°15'11"W). Body length to ~ 5 mm. See Schultz (1966 original description as *Cirolana joanneae*, but with prior listing in Schultz 1964 designated a *nomen nudum*; 1969), Bruce (1981, 1986a), Lissner et al. (1986), Wetzer et al. (1991), Brusca et al. (1995), Wetzer and Brusca (1997), McLaughlin et al. (2005), Macdonald et al. (2010), and SCAMIT (2011–2021).

*Natatolana californiensis* (Schultz, 1966) [Fig. 7G] Offshore submarine canyons and basins, on fine sand and muddy bottoms (792–1250 m); primarily southern California, USA (e.g., Coronado Canyon, Tanner Canyon), with a few records from the Gulf of California, Mexico and further south (Costa Rica and Peru-Chile Trench). Type locality: USA, California, Coronado Canyon offshore southern San Diego (R/V Velero IV Station No. 6851-60; 32°37'54"N, 118°55'40"W). Body length to ~ 13.4 mm. See Schultz (1966 original description as *Cirolana californiensis*; 1969), Brusca and Ninos (1978), Bruce (1981, 1986a), Brusca and Iverson (1985), Wetzer et al. (1991), Brusca et al. (1995), Espinosa-Pérez and Hendrickx (2001a, 2006), McLaughlin et al. (2005), Keable (2006), Espinosa-Pérez et al. (2009), SCAMIT (2011–2021), Ranasinghe et al. (2012), Gillett et al. (2019), and Zúñiga Delgado et al. (2021).

## Family Corallanidae

*Excorallana tricornis occidentalis* Richardson, 1905 [Fig. 8A] Intertidal to continental shelf, on rocks, sandy beaches, in mangrove habitats, and as a commensal in sponges or temporary fish parasite (0–138 m); Catalina Island, southern California, USA to western Baja California Sur and the Gulf of California, Mexico, and south to Costa Rica and Panama. Type locality: Mexico, Gulf of California. Body length to ~ 11 mm. See Richardson (1905a), Bowman (1977), Delaney (1984, 1989, 1993), Brusca and Iverson (1985), Guzman et al. (1988), Espinosa-Pérez and Hendrickx (2001a, 2006), and Brusca et al. (2007).

*Excorallana truncata* (Richardson, 1899) [Fig. 8B] Intertidal to continental shelf (0–183 m); Point Conception, southern California, USA to Galapagos Islands, including Gulf of California (Bahia Concepcion). Type locality: USA, California, Catalina Island. Body length to ~ 21.5 mm. See Richardson (1899 original description as *Corallana truncata*; 1900b, 1905a), Delaney (1982, 1984, 1989), SCAMIT (1994–2021), Espinosa-Pérez and Hendrickx (2001a, 2002), McLaughlin et al. (2005), Brusca et al. (2007), Melwani and Kim (2008), and Gillett et al. (2019). Note: If confirmed, the Gillett et al. (2019) record extends the maximum depth range of this species slightly from 183 m to the upper slope between 200 and 500 m.

## Family Cymothoidae

*Ceratothoa gaudichaudii* (H. Milne Edwards, 1840) [Fig. 11A] Parasite of many species of pelagic fishes, including striped mullet off California, and pompano and herring from Baja California; southern California, USA to western Baja California, Mexico, and southward to Cape Horn and around to southern Patagonia, South America. Type locality: Chile, Coquimbo. Body length to ~ 55 mm. See H. Milne Edwards (1840 original description as *Cymothoa gaudichaudii*), Richardson (1899, 1905a as *Meinertia gaudichaudii*), Menzies (1962b as *Meinertia gaudichaudi*), Schultz (1969), Brusca (1977, 1981), Brusca and Iverson (1985), Espinosa-Pérez and Hendrickx (2001a, 2002, 2006), McLaughlin et al. (2005), Whitmore et al. (2005), Brusca et al. (2007), and Martin et al. (2015). Note: Species listed as *species inquirenda* by Martin et al. (2015), Hadfield and Smit (2020), and Zúñiga Dalgado et al. (2021). Note: See Endnote 6.

*Ceratothoa giberti* (Richardson, 1904) [Fig. 11B] Parasite in mouths of mullets and an unidentified flatfish; Newport Bay, Orange County, southern California, USA to western Baja California, Mexico, and the Gulf of California to Mazatlán. Type locality: Mexico, Mazatlán. Body length to ~ 29 mm. See Richardson (1904a original description as *Meinertia giberti*; 1905a), Schultz (1969), Brusca (1977, 1981), Espinosa-Pérez and Hendrickx (2001a, 2006), Brusca et al. (2004), McLaughlin et al. (2005), Whitmore et al. (2005), Martin et al. (2015), Hadfield et al. (2016), and Hadfield and Smit (2020).

*Elthusa californica* (Schioedte & Meinert, 1884) [Fig. 11C] Parasite of dwarf surfperch, shiner surfperch, surf smelt, topsmelt, arrow goby, California killifish, and California grunion (nearshore to 90 m), common in bays and lagoons; Alaska, USA to Punta Eugenio, Baja California Sur, Mexico, and off Peru (but uncommon south of San Diego, California and north of Washington State). Type locality: USA, California, near San Francisco. Body length to ~ 15 mm. See Schioedte and Meinert (1884 original description as *Livoneca californica*, but genus misspelled as *Lironeca*), (Richardson 1899, 1900b, 1905a), Fee (1927), Hatch (1947), Schultz (1969), Iverson (1974), Miller (1975), Brusca (1977, 1981), Kussakin (1979), Bruce (1990), SCAMIT (1998–2021), McLaughlin et al. (2005), Espinosa-Pérez

and Hendrickx (2006), Brusca et al. (2007), Espinosa-Pérez et al. (2009), Shaughnessy et al. (2017), van der Wal et al. (2019), and Zúñiga Delgado et al. (2021).

*Elthusa menziesi* (Brusca, 1981) [Fig. 11D] Parasite in gill chambers of the wooly sculpin, northern clingfish and reef finspot (tidepools to 30 m); Baja California Norte (e.g., Coronado Islands, Todos Santos Bay, San Quintin Bay, and Guadalupe Island) to Baja California Sur (e.g., Alijos Rocks) and the Gulf of California, Mexico. Type locality: Mexico, Baja California Norte, Guadalupe Island, Melpomene Cove. Body length to 21 mm. See Menzies (1962a as *Lironeca* sp. nov., but undescribed), Brusca (1981 original description as *Lironeca menziesi*), Campos-González et al. (1986), Bruce (1990), Espinosa-Pérez and Hendrickx (2001a, 2002, 2006), McLaughlin et al. (2005), Whitmore et al. (2005), and van der Wal et al. (2019).

*Elthusa vulgaris* (Stimpson, 1857) [Fig. 11E] Parasite in gill chambers of at least 30 species of fishes (1–311 m); Coos Bay, Oregon, USA to Colombia, South America, and common from southern California, USA and the Gulf of California, Mexico to Costa Rica. Type locality: USA, California, San Francisco Bay. Body length to ~ 43 mm. See Stimpson (1857 original description as *Livoneca vulgaris*), Richardson (1899, 1900b, 1905a), Shearer (1942), Hatch (1947), Schultz (1969), Miller (1975), Brusca (1978b, 1981), Kussakin (1979), Lee and Miller (1980), Brusca and Iverson (1985), Bruce (1990), Thompson et al. (1993), SCAMIT (1994–2021), Espinosa-Pérez and Hendrickx (2001a, 2006), Brusca et al. (2004, 2007), McLaughlin et al. (2005), Whitmore et al. (2005), Kalman (2006), Ranasinghe et al. (2007), Shaughnessy et al. (2017), van der Wal et al. (2019), and García-Madrigal et al. (2022).

*Mothocyia rosea* Bruce, 1986 [Fig. 10D] Parasite of California halfbeak and skipper halfbeak; San Diego, southern California, USA to Magdalena Bay, Baja California Sur, Mexico, and Nicaragua. Type locality: Mexico, Baja California Sur, San Ignacio Lagoon (~ 26°25'N, 113°13'W). Body length to ~ 8.4 mm. See Bruce (1986b), Wetzer et al. (1991), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), Brusca et al. (2007), and Espinosa-Pérez et al. (2009).

*Nerocila acuminata* Schioedte & Meinert, 1881 [Fig. 10B] Parasite of ~ 40 species of fishes, especially common in shallow coastal lagoons and bays; southern California, USA to Peru, including the west coast of Baja California, Mexico, the Gulf of California, Costa Rica, Peru, the offshore islands of Las Tres Marias and the Galapagos, Hawaii, and in the southern Atlantic Ocean. Type locality: not specified, but the types for *N. acuminata* and its junior synonym *N. californica* as designated by Brusca (1981) are deposited at Muséum National d'Histoire Naturelle, Paris. Body length to ~ 25 mm. See Schioedte and Meinert (1881), Richardson (1900b, 1905a), Schultz (1969), Miller (1975), Brusca (1977, 1978a, 1981), Kussakin (1979), Brusca and Iverson (1985), SCAMIT (1994–2021), Espinosa-Pérez and Hendrickx (2001a, 2002, 2006), Brusca et al. (2004, 2007), McLaughlin et al. (2005), Whitmore et al. (2005), Fogg et al. (2016), Esteves-Silva et al. (2020), Zúñiga Delgado et al. (2021), Aguilar-Perera (2022), Bueno et al. (2022), and García-Madrigal et al. (2022). Note: See Brusca (1981: 157–158) for descriptions

and discussion of the *acuminata* and *aster* forms of *N. acuminata*. Additionally, although Brusca (1981) synonymized *N. acuminata* with *N. californica* Schioedte & Meinert, 1881, both are currently accepted as separate species in WoRMS (Boyko et al. 2008 onwards). Also see Williams and Bunkley-Williams (2003) for additional information. However, until a rigorous morphological and molecular comparison can be made, we are continuing to treat these as the single synonymized species *N. acuminata* in agreement with Brusca (1981).

*Renocila thresherorum* Williams & Bunkley-Williams, 1980 [Fig. 10A] Parasite of barspot cardinalfish and Panamic fanged blenny in the Eastern Pacific (i.e., Corona del Mar, southern California, USA; Magdalena Bay, Baja California Sur and the central to southern Gulf of California, Mexico), and of Egyptian sole, European bass, redbelly tilapia, and thinlip grey mullet in the Suez Canal region of Egypt (e.g., Lake Qaroun). Type locality: Mexico, Baja California Sur, Loreto. Body length to ~ 30.5 mm. See Williams and Williams (1980), Brusca (1981), Williams and Williams (1987), Espinosa-Pérez and Hendrickx (2006), Kerstitch and Bertsch (2007), Eman et al. (2014), Mahmoud et al. (2016), Ali and Aboyadak (2018), and Aneesh et al. (2020, 2021). Note: See Endnote 5.

*Smenispa convexa* (Richardson, 1905) [Fig. 10C] Parasite in mouths or gill chambers of Pacific bumper, pompanos, serranos, and unidentified carangids; southern California, USA to the Gulf of Guayaquil, Ecuador, and Peru. Type locality (neotypes; see Brusca 1981): Mexico, Nayarit, Playa Noviella, west of Tecuelao. Body length to ~ 15 mm. See Richardson (1905c original description as *Livoneca convexa*), Menzies et al. (1955), Schultz (1969), Brusca (1977, 1981), Brusca and Iverson (1985), Wetzer et al. (1991), SCAMIT (1998–2021), Espinosa-Pérez and Hendrickx (2001a, 2006), McLaughlin et al. (2005), Whitmore et al. (2005), Kalman (2006), Brusca et al. (2007), Özdkem (2009), and Zúñiga Delgado et al. (2021).

## Family Gnathiidae

*Caecognathia crenulatifrons* (Monod, 1926) [Fig. 12A] Continental shelf, slope, and submarine canyons, benthic sediments (9–1376 m); Strait of Georgia, British Columbia, Canada to Todos Santos Bay, Baja California Norte, Mexico. Type locality: USA, California, La Jolla. Male body length to ~ 4.3 mm. See Monod (1926 original description as *Gnathia crenulatifrons*), Menzies and Barnard (1959), Schultz (1964, 1966, 1969), Iverson (1974), Miller (1975), Lissner et al. (1986), Thompson et al. (1993), SCAMIT (1994–2021), Wetzer and Brusca (1997), Bergen et al. (1998), Smit and Davies (2004), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), Haney (2006), Ranasinghe et al. (2007, 2012), Campos and Villarreal (2008), Espinosa-Pérez et al. (2009), Macdonald et al. (2010), and Gillett et al. (2017, 2019, 2022).

*Caecognathia sanctaerucis* (Schultz, 1972) [Fig. 12B] Continental shelf, slope, and submarine canyons, benthic sediments (76–218 m); Strait of Georgia, British Columbia, Canada to Todos Santos Bay, Baja California Norte, Mexico. Type locality: USA, California, Santa Cruz Canyon (R/V Velero IV Station No. 6805-59; 33°56'03"N,

119°52'03" W). Male body length ~ 2.6 mm. See Schultz (1966 original description as *Gnathia hirsuta*; 1972 for “substitution for preoccupied name”), Lissner et al. (1986), Wetzer et al. (1991), SCAMIT (1994–2021), Wetzer and Brusca (1997), Bergen et al. (1998), Smit and Davies (2004), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), Haney (2006), Campos and Villarreal (2008), Macdonald et al. (2010), and Gillett et al. (2017).

*Caecognathia* sp. A [No figure] Continental shelf (110–126 m); Western Santa Barbara Channel off Point Conception, southern California, USA. Male body length to ~ 4.3 mm. See Haney (2006) and SCAMIT (2008–2021). Note: See Endnote 8.

*Caecognathia* sp. SD1 [No figure] Continental shelf, soft-bottom benthos (116–153 m); San Diego, southern California, USA. Male body length ~ 3.4 mm. See Haney (2006), SCAMIT (2008–2021), Ranasinghe et al. (2012), and Gillett et al. (2022). Note: See Endnote 8.

*Gnathia clementensis* Schultz, 1966 [Fig. 12C] Continental shelf, benthic sediments with manganese nodules (162 m); San Clemente Canyon, southern California, USA (known only from type locality). Type locality: USA, California, San Clemente Canyon (R/V Velero IV Station No. 6840-60; 32°44'35"N, 118°12'45"W). Male body length to ~ 8.5 mm. See Schultz (1966, 1969), Wetzer et al. (1991), Smit and Davies (2004), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), and Haney (2006).

*Gnathia coronadoensis* Schultz, 1966 [Fig. 12D] Offshore submarine canyons, benthic sediments (344–812 m); Coronado Canyon, southern California, USA. Type locality: USA, California, Coronado Canyon (R/V Velero IV Station No. 6851-60; 32°30'42"N, 117°21'37"W). Male body length to ~ 3.5 mm. See Schultz (1966, 1969), Wetzer et al. (1991), Smit and Davies (2004), McLaughlin et al. (2005), and Haney (2006).

*Gnathia productatridens* Menzies & Barnard, 1959 [Fig. 12E] Continental shelf, benthic sediments (20–164 m); Point Conception, Santa Barbara County, southern California, USA. Type locality: USA, California, off Summerland (R/V Velero IV Station No. 5173-57; 34°14'50"N, 119°32'25"W). Male body length to ~ 3.2 mm. See Menzies and Barnard (1959), Schultz (1969), Lissner et al. (1986), Wetzer et al. (1991), SCAMIT (1996–2021), Wetzer and Brusca (1997), Smit and Davies (2004), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), Haney (2006), Ranasinghe et al. (2012), and Gillett et al. (2019). Note: If confirmed, the Gillett et al. (2019) record extends the maximum depth range of this species slightly from 164 m to the upper slope between 200–500 m.

*Gnathia steveni* Menzies, 1962 [Fig. 12F] Intertidal; Strait of Georgia, British Columbia, Canada to San Quintin Bay, Baja California Norte, Mexico. Type locality: Mexico, Baja California, Bahia de San Quintin. Male body length to ~ 2.3 mm. See Menzies (1962a), Schultz (1969), Wetzer et al. (1991), Fairey et al. (2002), Smit and Davies (2004), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), Haney (2006), Brusca et al. (2007), SCAMIT (2008–2021), and Macdonald et al. (2010).

*Gnathia tridens* Menzies & Barnard, 1959 [Fig. 12G] Shallow subtidal (11–27 m); Strait of Georgia, British Columbia, Canada to San Clemente Island, southern California, USA. Type locality: USA, California, 11 miles east of Point Conception

(R/V *Velero IV* Station No. 4822-57; 34°27'15"N, 120°14'45"W). Male body length to ~ 3 mm. See Menzies and Barnard (1959), Schultz (1969), Lissner et al. (1986), Wetzer et al. (1991), SCAMIT (1994–2021), Wetzer and Brusca (1997), Smit and Davies (2004), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), Haney (2006), Espinosa-Pérez et al. (2009), Macdonald et al. (2010), and Henkel et al. (2020).

*Gnathia trilobata* Schultz, 1966 [Fig. 12H] Continental shelf and submarine canyons, collected from polychaete tubes and benthic sediments (98–976 m); Strait of Georgia, British Columbia, Canada to Point Loma, San Diego, southern California, USA. Type locality: USA, California, Coronado Canyon (R/V *Velero IV* Station No. 6851-60; 32°30'42"N, 117°21'37"W). Male body length to ~ 5 mm. See Schultz (1966, 1969), Wetzer et al. (1991), SCAMIT (1994–2021), Bergen et al. (1998), Smit and Davies (2004), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), Haney (2006), Ranasinghe et al. (2007), and Macdonald et al. (2010).

*Gnathia* sp. MBC1 [No figure] Shallow rocky reef, collected from a white sponge (~ 11 m); Pequenot's Reef, Corona del Mar, southern California, USA. Male body length ~ 2.2 mm. See Haney (2006) and SCAMIT (2008–2021). Note: See Endnote 8.

## Family Tridentellidae

*Tridentella glutacantha* Delaney & Brusca, 1985 [Fig. 8C] Continental shelf and upper slope, on green muds or rocky bottoms (128–360 m); Farallon Islands, central California to Catalina Island and Los Angeles, southern California, USA. Type locality: USA, California, west of North Farallon Islands (37°43.8'N; 123°11.3'W). Body length to ~ 18 mm. See Delaney and Brusca (1985), Wetzer et al. (1991), Kensley and Heard (1997), Wetzer and Brusca (1997), Brandt and Poore (2001), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), Espinosa-Pérez et al. (2009), and SCAMIT (2013–2021).

*Tridentella quinicornis* Delaney & Brusca, 1985 [Fig. 8D] Continental shelf, on “rock” substrates (depth of at least 53 m); Santa Barbara Island to near Catalina Island, southern California, USA. Type locality: USA, California, Los Angeles County, Farnsworth Bank near Catalina Island (R/V *Velero IV* Station No. 1903-49). Body length to ~ 11 mm. See Delaney and Brusca (1985), Wetzer et al. (1991), SCAMIT (1996–2021), Kensley and Heard (1997), Brandt and Poore (2001), McLaughlin et al. (2005), and Espinosa-Pérez and Hendrickx (2006).

## Infraorder Epicaridea

### Superfamily Bopyroidea

#### Family Bopyridae

*Anathelges hyphalus* (Markham, 1974) [Fig. 13C] Branchial parasite of hermit crabs *Parapaguroides laurentae* and *P. makarovi*, deep water (69–319 m); Carmel, California, USA to western Baja California Norte, Mexico. Type locality: USA,

California, Santa Barbara, Channel Islands (R/V *Velero III* Station No. 1026-39; 33°00'N; 118°38'W) infesting *P. makarovi*. Female body length to ~ 6.1 mm (male ~ 2.6 mm). See Markham (1974a original description as *Stegophryxus hyphalus*; 1992, 2003, 2020), Wetzer et al. (1991), SCAMIT (2001–2021), Boyko and Williams (2003), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), and Stebbins (2012b).

*Aporobopyrus muguensis* Shiino, 1964 [Fig. 14B] Branchial parasite of the porcelain crabs *Pachycheles holosericus*, *P. pubescens*, and *P. rufus*, shallow water (10–12 m); Bodega Bay, northern California, USA to central western Baja California, Mexico. Type locality: USA, California, Point Mugu, off Mugu Pier infesting *P. rufus*. Female body length to ~ 4 mm (male ~ 2.7 mm). See Shiino (1964), Miller (1975), Lee and Miller (1980), Campos-González and Campoy-Favela (1987), Markham (1992, 2008), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), Brusca et al. (2007), Stebbins (2012b), and Aguilar-Perera (2022).

*Aporobopyrus oviformis* Shiino, 1934 [Fig. 14C] Branchial parasite of the porcelain crabs *Pachycheles pubescens* and *Petrolisthes pubescens*, shallow water (10–12 m); Point Mugu, California, USA, and Seto, Japan. Type locality: Japan, Seto, Yusaki infesting *Petrolisthes pubescens*. Female body length to ~ 5.8 mm (male ~ 2.5 mm). See Shiino (1934), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), Brusca et al. (2007), and Stebbins (2012b).

*Argeia pugettensis* Dana, 1853 [Fig. 14A] Branchial parasite of multiple species of crangonid and hippolytid shrimp (intertidal to 188 m); Bering Sea to southern California, and the US-Mexico border, Japan, and Korea. Type locality: USA, Washington, Puget Sound infesting *Metacrangon munitus*. Female body length to ~ 14 mm (male ~ 5.5 mm). See Dana (1853), Richardson (1899, 1900c, 1905a), Fee (1927), Shearer (1942), Hatch (1947), George and Strömberg (1968), Miller (1975), Markham (1977b, 1992), Higley and Holton (1978), Ricketts et al. (1985), Jay (1989), SCAMIT (2001–2021), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), Brusca et al. (2007), Espinosa-Pérez et al. (2009), Puget Sound Institute (2012–2023), and Stebbins (2012b).

*Asymmetrione ambodistorta* Markham, 1985 [Fig. 14D] Branchial parasite of the hermit crab *Isocheles pilosus*, shallow water (3 m): southern California, USA. Type locality: USA, California, Newport Beach, Corona del Mar State Beach. Female body length to ~ 5.4 mm (male ~ 2.8 mm). See Markham (1985b, 2003), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), Brusca et al. (2007), and Stebbins (2012b).

*Bathygyge grandis* Hansen, 1897 [Fig. 13B] Branchial parasite of deep-water shrimp of the genus *Glyphocrangon* (1792–1896 m in SCB); worldwide distribution, including San Clemente Basin, southern California, USA. Type locality: Mexico, off Acapulco (21°15'N, 106°23'W) infesting *G. spinulosa*. Female body length to ~ 12.7 mm (male ~ 6.8 mm). See Hansen (1897), Richardson (1899, 1905a), Espinosa-Pérez and Hendrickx (2001a), Stebbins (2012b), Markham (2016, 2020), and García-Madrigal et al. (2022).

*Bopyrella calmani* (Richardson, 1905) [Fig. 15A] Branchial parasite of alpheid snapping shrimps *Alpheopsis equidactylus* and *Synalpheus lockingtoni*, (intertidal to 9 m); Central to southern California, USA. Type locality: USA, California, between Santa Barbara and San Nicolas Island. Female body length to ~ 8 mm (male ~ 2.2 mm). See Richardson (1905a original description as *Bopyriscus calmani*), Sassaman et al. (1984), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), and Stebbins (2012b).

*Capitetragonia* sp. A [Fig. 15B, image of representative species *C. alphei*] Branchial parasite of the undescribed alpheid shrimp *Automate* sp. A (30 m depth); collected offshore of Palos Verdes, Los Angeles County, southern California, USA. No body size information available, but total length for the type species of the genus, *Capitetragonia alphei* (Richardson, 1900a), measured 5.1 mm (see Markham 1985a, p. 43). See SCAMIT (2012–2021) and Stebbins (2012b). Note: Provisional species originally described as *Probopyria* sp. A (see Endnote 9).

*Eremitione giardi* (Calman, 1898) [Fig. 15C] Branchial parasite of hermit crabs of the genus *Pagurus*; Bering Sea to Palos Verdes, southern California, USA. Type locality: USA, Washington, Puget Sound infesting *P. armatus*. Female body length to ~ 12 mm (male ~ 3 mm). See Calman (1898 original description as *Pseudione giardi*), Richardson (1899, 1900c, 1905a), Hatch (1947), George and Strömborg (1968), Markham (1974b), Boyko and Williams (2004), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), SCAMIT (2011–2021), Stebbins (2012b), and Williams et al. (2019). Note: Record of species in California waters questionable (see Endnote 10).

*Leidya infelix* Markham, 2002 [Fig. 13D] Branchial parasite of the grapsid crab *Pachygrapsus crassipes* (intertidal); southern California, USA to Baja California Norte, Mexico. Type locality: Mexico, Baja California Norte, San Quintín (30°28'N; 115°58'W). Female body length to ~ 7.9 mm (male ~ 1 mm). See Markham (2002), Boyko (2003), and Stebbins (2012b).

*Munidion pleuroncodis* Markham, 1975 [Fig. 13E] Branchial parasite of the pelagic galatheid crab *Pleuroncodes planipes*; Central California, USA to central Mexico, typically occurring in southern California during warm water years (e.g., El Niños). Type locality: Mexico, Baja California (26°22'N, 115°05'W). Female body length to ~ 9.8 mm (male ~ 4.4 mm). See Markham (1975), Lissner et al. (1986), Wetzer and Brusca (1997), SCAMIT (2001–2021), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), Brusca et al. (2007), and Stebbins (2012b).

*Orthione griffenis* Markham, 2004 [Fig. 14E] Branchial parasite of mud shrimp *Upogebia pugettensis* and *U. macginitieorum*; introduced species from Asia (China, Japan), occurring from British Columbia, Canada to southern California, USA along west coast of North America. Type locality: USA, Oregon, Yaquina Bay, Idaho Inlet mudflats (44°35.4'N, 124°01.5'W) infesting *U. pugettensis*. Female body length to ~ 24 mm (male to ~ 10.3 mm). See Markham (2004), Williams and An (2009), Dumbauld et al. (2011), Chapman et al. (2012), Puget Sound Institute (2012–2023), Stebbins (2012b), SCAMIT (2013–2021), Hong et al. (2015), and Whalen et al. (2020).

*Phyllodurus abdominalis* Stimpson, 1857 [Fig. 13F] Abdominal parasite of the mud shrimp *Upogebia lepta*, *U. macginitieorum*, and *U. pugettensis* (intertidal): British Columbia, Canada to Baja California Norte, Mexico. Type locality (see Markham 1977a): USA, Washington, Puget Sound and California, Tomales Bay. Female body length to ~ 14 mm (male ~ 6 mm). See Stimpson (1857), Richardson (1899, 1900c, 1905a), Fee (1927), Hatch (1947), George and Strömberg (1968), Miller (1975), Markham (1977a, 1992), Lee and Miller (1980), Campos-González and Campoy-Favela (1987), SCAMIT (1994–2021), Espinosa-Pérez and Hendrickx (2006), Brusca et al. (2007), Stebbins (2012b), and Aguilar-Perera (2022).

*Progebiophilus bruscai* Salazar-Vallejo and Leija-Tristán, 1990 [Fig. 14F] Branchial parasite of the mud shrimp *Upogebia dawsoni*, *U. spinigera*, *U. macginitieorum*, and *Pomatogebia rugosa*; Todos Santos Bay, Ensenada, Baja California Norte, Mexico to Tortugas Bay, Baja California Sur, the Gulf of California, and Nicaragua. Type locality: Mexico, Baja California Sur, Bahía de la Paz, Laguna de La Paz, El Comitán infesting *U. dawsoni*. Female body length to ~ 12 mm (male ~ 3.9 mm). See Salazar-Vallejo and Leija-Tristán (1990), Campos and de Campos (1998), Espinosa-Pérez and Hendrickx (2001a, 2006), Markham (2005), Boyko et al. (2017), and Aguilar-Perera (2022).

*Pseudionae galacanthae* Hansen, 1897 [Fig. 15D] Branchial parasite of the squat lobsters *Galacantha diomedae* and *Munida quadrispina*, deep water (> 50 m); British Columbia, Canada to Gulf of California, Mexico. Type locality: Mexico, central Gulf of California (Albatross Station No. 3435; 26°48'00"N, 110°45'20"W) infesting *Galacantha diomedae*. Female body length to ~ 11 mm (male ~ 4.8 mm). See Hansen (1897), Richardson (1899, 1905a), Fee (1927), Hatch (1947), George and Strömberg (1968), Markham (1974b), Espinosa-Pérez and Hendrickx (2001a, 2006), Boyko and Williams (2004), McLaughlin et al. (2005), and Stebbins (2012b). Note: Record of species in California waters questionable (J Markham, pers. comm.), nor is this species listed within SCB waters in Markham (2020).

*Schizobopyrina striata* (Nierstrasz & Brender à Brandis, 1929) [Fig. 15E] Branchial parasite of the alpheoid shrimps *Hippolyte californiensis* in San Diego Bay and *Thor algicola* in the Gulf of California, shallow water; California, USA to Baja California, Mexico, and the Gulf of California. Type locality: USA, California, San Diego, San Diego Bay. Female body length to ~ 4 mm. See Nierstrasz and Brender à Brandis (1929 original description as *Bopyrina striata*), Ricketts et al. (1985), Campos and de Campos (1990), Markham (1992), Espinosa-Pérez and Hendrickx (2001a, 2006), McLaughlin et al. (2005), Brusca et al. (2007), and Stebbins (2012b).

## Family Ionidae

*Ione cornuta* Spence Bate, 1863 [Fig. 13A] Branchial parasite of ghost shrimps of the genera *Callianassa* and *Neotrypaea* in the eastern Pacific, and *Nihonotrypaea* and *Upogebia* in Asia, intertidal to shallow water; British Columbia, Canada to California, USA, the Gulf of California, Mexico, Japan, Korea, and China. Type locality: Canada, British Columbia, Vancouver Island, infesting *Neotrypaea gigas* (originally

as *Callianassa longimana*). Female body length to ~ 12 mm. See Bate (1863), Richardson (1899, 1900c, 1905a), Hatch (1947), Miller (1975), Markham (1992), Nobuhiro and Kyoko (2004), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), Brusca et al. (2007), An et al. (2009), Espinosa-Pérez et al. (2009), Stebbins (2012b), and Boyko et al. (2017).

## Superfamily Cryptoniscoidea

### Family Dajidae

*Holophryxus alaskensis* Richardson, 1905 [Fig. 16A] Ectoparasite on carapace of the Pacific glass shrimp *Pasiphaea pacifica*, mostly deep waters (44–1200 m); Prince William Sound, Alaska, USA to offshore of the US-Mexico border. Type locality: USA, Alaska, Behm Canal, vicinity of Yes Bay (~ 55°51'05"N, 131°49'43"W). Adult female body length to ~ 13.6 mm (male ~ 2.0 mm). See Richardson (1905a, 1905b, 1908), Butler (1964), Coyle and Mueller (1981), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), SCAMIT (2012–2021), Stebbins (2012b), Markham (2020), and Boyko and Williams (2021b). Note: See Endnote 11.

*Zonophryxus* sp. [Fig. 16B, image of representative species *Z. probisowa*] Ectoparasite on carapace of the caridean shrimps *Pantomus affinis* and *Plesionika trispinus*, offshore (98–305 m); southern California, USA between Point Dume and Imperial Beach. Body length = no information available. See Montagne and Cadien (2001), SCAMIT (2012–2021), Markham (2020), and Boyko and Williams (2021a). Note: See Endnote 12.

### Family Hemioniscidae

*Hemioniscus balani* Buchholz, 1866 [Fig. 16C] Parasite on barnacles of genera *Balanus* and *Chthamalus*, intertidal; worldwide distribution, including from at least British Columbia, Canada to Baja California, Mexico along the west coast of North America. Type locality: Norway, Kristiansand. See Buchholz (1866), Nierstrasz and Brender à Brandis (1926), Crisp (1968), Campos-González and Campoy-Favela (1987), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), SCAMIT (2012–2021), and Stebbins (2012b).

## Suborder Limnoriidea

### Superfamily Limnorioidea

#### Family Limnoriidae

*Limnoria algarum* Menzies, 1957 [Fig. 17A] Burrowing into algal holdfasts, intertidal to subtidal (0–15 m); Strait of Georgia, British Columbia, Canada to San Diego, southern California, USA. Type locality: USA, California, Marin County, Dillon Beach. Body length to ~ 5.5 mm. See Menzies (1957), Menzies and Barnard

(1959), Schultz (1969), Miller (1975), Kussakin (1979), Lee and Miller (1980), Ricketts et al. (1985), Cookson (1991), SCAMIT (1996–2021), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), Brusca et al. (2007), Espinosa-Pérez et al. (2009), Macdonald et al. (2010), and Roletto et al. (2014).

*Limnoria quadripunctata* Holthuis, 1949 [Fig. 17B] Burrowing into wood, intertidal to subtidal (0–30 m); worldwide cool temperate distribution, including Humboldt Bay, northern California to San Diego, southern California, USA. Type locality: North Sea coast of Dutch province of Zuid-Holland between villages of Katwijk and Noordwijk, not far from Leiden. Body length to ~ 3.4 mm. See Holthuis (1949), Menzies and Mohr (1952), Menzies (1957), Schultz (1969), Miller (1975), Kussakin (1979), Lee and Miller (1980), Ricketts et al. (1985), Cookson (1991, 1997), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), Brusca et al. (2007), Espinosa-Pérez et al. (2009), SCAMIT (2012–2021), Borges and Costa (2014), and Borges et al. (2014).

*Limnoria tripunctata* Menzies, 1951 [Fig. 17C] Burrowing into wood, intertidal to subtidal (0–7 m); temperate and tropical locations worldwide, including Puget Sound, Washington, USA to Mazatlán, Mexico, and the Gulf of California in the eastern Pacific. Type locality: USA, California, San Diego County, Mission Bay. Body length to ~ 4 mm. See Menzies (1951a, 1957), Menzies and Glynn (1968), Schultz (1969), Bastida and Torti (1972), Miller (1975), Allen (1976), Lee and Miller (1980), Brusca and Iverson (1985), Ricketts et al. (1985), Cookson (1991), Wetzer et al. (1991), Espinosa-Pérez and Hendrickx (2001a, 2006), Cohen et al. (2005), McLaughlin et al. (2005), Brusca et al. (2007), SCAMIT (2008–2021), Puget Sound Institute (2012–2023), Borges and Costa (2014), Borges et al. (2014), Shaughnessy et al. (2017), Ortiz and Lalana (2018), and Abdelsalam and Ramadan (2019).

### **Suborder Sphaeromatidea**

#### **Superfamily Seroloidea**

##### **Family Serolidae**

*Heteroserolis carinata* (Lockington, 1877) [Fig. 18A] Intertidal to continental shelf, soft bottom benthos (0–98 m); Santa Monica Bay, southern California, USA to San Quintin Bay, Baja California Norte, Mexico, and the Gulf of California. Type locality: USA, California, San Diego. Body length to ~ 6.4 mm. See Lockington (1877a original description as *Serolis carinatus*), Richardson (1899, 1900b, 1905a), Menzies and Barnard (1959), Menzies (1962a), Schultz (1969), Hessler (1972), Glynn (1976), Dexter (1983), Lissner et al. (1986), SCAMIT (1994–2021), Bergen et al. (1998), Espinosa-Pérez and Hendrickx (2001a, 2006), Smith et al. (2001, 2003), Ranasinghe et al. (2003, 2007, 2012), McLaughlin et al. (2005), Reed and Hovel (2006), Sirota and Hovel (2006), Brusca et al. (2007), Campos and Villarreal (2008), Melwani and Kim (2008), Bruce (2009b), and Gillett et al. (2017). Note: See Endnote 13.

## Superfamily Sphaeromatoidea

### Family Ancinidae

*Ancinus granulatus* Holmes & Gay, 1909 [Fig. 19A] Intertidal to shallow subtidal (0–10 m); Santa Barbara, southern California, USA to the Gulf of California, Mexico. Type locality: USA, California, near Coronado Island from depth of 3 fathoms. Body length to ~ 9.5 mm. See Holmes and Gay (1909), Loyola e Silva (1971), Schultz (1973), Glynn and Glynn (1974), Pires (1987), SCAMIT (1998–2021), Espinosa-Pérez and Hendrickx (2001a, 2006), Ranasinghe et al. (2003, 2007), Brusca et al. (2004, 2007), McLaughlin et al. (2005), Campos and Villarreal (2008), and Rocha-Ramírez et al. (2010). Note: See Endnote 14.

*Ancinus seticomvus* Trask, 1971 [Fig. 19B] Low intertidal on sandy beaches; Santa Barbara, southern California, USA to Mazatlán, Mexico, and the Gulf of California. Type locality: USA, California, Santa Barbara County, Coal Oil Beach (~ 34°28'N; 119°50'W). Body length to 10.5 mm. See Trask (1971), Schultz (1973), Glynn and Glynn (1974), Dexter (1976), Iverson (1982), Iverson and Chivers (1984), Pires (1987), Wetzer et al. (1991), McLaughlin et al. (2005), and Rocha-Ramírez et al. (2010). Note: *Ancinus seticomvus* is listed as a junior synonym of *A. granulatus* in SCAMIT (1998–2021) and Brusca et al. (2007). See Endnote 14 for a summary of the taxonomic history of *A. seticomvus*.

*Bathycopea daltonae* (Menzies & Barnard, 1959) [Fig. 19C] Sandy subtidal sediments (17–137 m); Columbia River Estuary, Washington State to San Miguel Island and White's Point, Los Angeles County, southern California. USA. Type locality: USA, California, off Point Conception (R/V Velero IV Station No. 4819-57; 34°26'30"N, 120°28'10"W). Body length to ~ 4 mm. See Menzies and Barnard (1959 original description as *Ancinus daltonae*), Loyola e Silva (1971), Schultz (1973), Iverson and Chivers (1984), Miller (1975), Higley and Holton (1978), Kussakin (1979), Wetzer et al. (1991), SCAMIT (2001–2021), Ranasinghe et al. (2003), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), Melwani and Kim (2008), Shimomura (2008), and Henkel et al. (2020).

### Family Sphaeromatidae

*Discerceis granulosa* (Richardson, 1899) [Fig. 20C] Subtidal (37 m); southern California, USA to Cedros Island, Baja California Norte, Mexico. Type locality: Mexico, Baja California, Cedros Island. Body length to ~ 9 mm. See Richardson (1899 original description as *Cilicaea granulosa*; 1905a, 1906), Schultz (1969), SCAMIT (1994–2021), McLaughlin et al. (2005), Schotte (2005), and Espinosa-Pérez and Hendrickx (2006).

*Dynamenella dilatata* (Richardson, 1899) [Fig. 22C] Intertidal; Tatoosh Island, Washington to southern California, USA. Type locality: USA, California, Monterey Bay. Body length to ~ 3 mm. See Richardson (1899 original description as *Dynamene dilatata*; 1900b, 1905a), Shearer (1942), Hewatt (1946), Hatch (1947), Schultz (1969), Miller (1975), Kussakin (1979), Lissner et al. (1986), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), Brusca et al. (2007), Espinosa-

Pérez et al. (2009), SCAMIT (2011–2021), and Lafferty and Suchanek (2016).

Note: See Endnote 17 regarding generic assignment of this species.

*Dynamenella glabra* (Richardson, 1899) [Fig. 22D] Intertidal; Coos Bay, Oregon to San Diego, southern California, USA. Type locality: USA, California, Monterey Bay. Body length to ~ 3 mm. See Richardson (1899 original description as *Dynamene glabra*; 1900b, 1905a), Shearer (1942), Hewatt (1946), Hatch (1947), Schultz (1969), Miller (1975), Kussakin (1979), Chess and Hobson (1997), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), Brusca et al. (2007), Espinosa-Pérez et al. (2009), and SCAMIT (2011–2021). Note: See Endnote 17 regarding generic assignment of this species.

*Dynamenella sheareri* (Hatch, 1947) [Fig. 22E] Intertidal to shallow subtidal; San Juan Archipelago, Washington to southern California, USA. Type locality: USA, Oregon, Coos Bay. Body length to ~ 3.3 mm. See Hatch (1947 original description as *Dynamene sheareri*), George and Strömberg (1968), Schultz (1969), Miller (1975), Kussakin (1979), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), Toft and Cordell (2006), Brusca et al. (2007), Toft et al. 2008, 2010), Espinosa-Pérez et al. (2009), SCAMIT (2011–2021), and Lafferty and Suchanek (2016).

*Dynoides elegans* (Boone, 1923) [Fig. 22A] Intertidal; southern California, USA from Santa Barbara County to San Diego, and possibly further south to Cedros Island, Baja California, Mexico. Type locality: USA, California, San Diego County, La Jolla, Scripps Institution of Oceanography (~ 32.27°N, 117.61°W). Body length to ~ 7.4 mm. See Boone (1923 original description as *Cianella elegans*), Hewatt (1946), Li (2000), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), Wetzer and Mowery (2017), SCAMIT (2018–2021), and Khalaji-Pirbalouty and Gagnon (2021). Note: SCB records of *Dynoides elegans* identified as *D. saldani* in SCAMIT (2012–2016).

*Exosphaeroma amplicauda* (Stimpson, 1857) [Fig. 23A] Intertidal; Marin, Sonoma, and San Mateo Counties, northern California, USA (as redefined by Wall et al. 2015). Type locality (neotype): USA, California, Marin County, Tomales Bay (38.201°N, 122.922°W). Body length to ~ 8.4 mm. See Stimpson (1857 original description as *Sphaeroma amplicauda*), Richardson (1900b, 1905a), Hewatt (1946), George and Strömberg (1968), Miller (1975), Allen (1976), Kussakin (1979), Lee and Miller (1980), Bruce (2003), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), Brusca et al. (2007), Espinosa-Pérez et al. (2009), SCAMIT (2011–2021), Wall et al. (2015), Lafferty and Suchanek (2016), and Gillett et al. (2022). Note: See Endnote 18 regarding restricted range of *E. amplicauda* based on review by Wall et al. (2015).

*Exosphaeroma aphrodita* Boone, 1923 [Fig. 23B] Intertidal to shallow subtidal, on pier pilings and amongst detritus at the base of pilings; La Jolla, southern California, USA. Type locality (lectotype): USA, California, San Diego County, La Jolla, Scripps Institution of Oceanography pier pilings. Body length to ~ 8.7 mm. See Boone (1923), Bruce (2003), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), Wall et al. (2015), and SCAMIT (2016–2021). Note: See Endnote 18.

*Exosphaeroma inornata* Dow, 1958 [Fig. 23C] Intertidal to shallow subtidal, in holdfasts of the kelp *Macrocystis pyrifera*; Puget Sound, Washington, USA to Todos

Santos Bay, Baja California Norte, Mexico. Type locality: USA, California, Los Angeles County, San Pedro, Point Fermin (~ 33°40'N, 118°20'W). Body length to ~ 6 mm. See Dow (1958), Schultz (1969), Iverson (1974, 1978, 1982), Miller (1975), Wetzer et al. (1991), Bruce (2003), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), Brusca et al. (2007), Campos and Villarreal (2008), Espinosa-Pérez et al. (2009), SCAMIT (2011–2021), Puget Sound Institute (2012–2023), Roletto et al. (2014), and Wall et al. (2015).

*Exosphaeroma pentcheffi* Wall, Bruce & Wetzer, 2015 [Fig. 23D] High to low rocky intertidal, amongst barnacles, algal turf, and *Phragmatopoma* worm tubes on undersides of rocks; Palos Verdes, southern California, USA. Type locality: USA, California, Los Angeles County, Palos Verdes Peninsula, Point Fermin (33.71°N, 118.3°W). Body length to ~ 6.8 mm. See Wall et al. (2015) and SCAMIT (2015–2021). Note: Records of *E. pentcheffi* reported as provisional species *Exosphaeroma* sp. A in SCAMIT (2012–2014).

*Exosphaeroma rhomburum* (Richardson, 1899) [Fig. 23E] Intertidal to 26 m; Tatoosh Island, Washington, USA to Baja California Norte, Mexico (~ 4.3–6.7 km south of the US-Mexico border). Type locality: USA, California, Monterey Bay. Body length to ~ 4 mm. See Richardson (1899 original description as *Sphaeroma rhomburum*; 1900b, 1905a), Shearer (1942), Schultz (1969), Miller (1975), Kussakin (1979), Hobson and Chess (1986), SCAMIT (1994–2021), Chess and Hobson (1997), Bruce (2003), Ranasinghe et al. (2003), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), Brusca et al. (2007), Wall et al. (2015), Lafferty and Suchanek (2016), and Looby and Ginsburg (2021). Note: See Endnote 19.

*Gnorimosphaeroma noblei* Menzies, 1954 [Fig. 20A] High intertidal, brackish to fully freshwater habitats; Del Norte County, northern California to Palos Verdes, Los Angeles County, southern California, USA. Type locality: USA, California, Marin County, Tomales Bay, Marshall (38.162°N, 122.89°W). Body length to ~ 2.9 mm. See Menzies (1954), Schultz (1969), Iverson (1974), Miller (1975), Kussakin (1979), Ricketts et al. (1985), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), Brusca et al. (2007), Espinosa-Pérez et al. (2009), and Wetzer et al. (2021).

*Gnorimosphaeroma oregonense* (Dana, 1853) [Fig. 20B] Intertidal to subtidal (0–21 m); Vancouver, British Columbia, Canada to San Francisco, California, USA. Type locality (neotype; see Wetzer et al. 2021): Canada, British Columbia, Stanley Park (49.294°N, 123.155°W). Body length to ~ 8.5 mm. See Dana (1853 original description as *Sphaeroma oregonensis*), Richardson (1899, 1900b, 1905a), Menzies (1954), George and Strömberg (1968), Miller (1968), Schultz (1969), Miller (1975), Higley and Holton (1978), Kussakin (1979), Ricketts et al. (1985), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), Brusca et al. (2007), Ranasinghe et al. (2007), Espinosa-Pérez et al. (2009), SCAMIT (2011–2021), Puget Sound Institute (2012–2023), Lafferty and Suchanek (2016), Gillett et al. (2017), and Wetzer et al. (2021). Note: See Endnote 15 regarding distribution of *G. oregonense*.

*Paracerceis cordata* (Richardson, 1899) [Fig. 21A] Intertidal to shallow subtidal, on coralline algae and kelp holdfasts; Aleutian Islands to southern California, USA. Type

locality: Aleutian Islands, Popoff Island. Body length to ~ 7.1 mm. See Richardson (1899 original description as *Cilicaea cordata*; 1900b, 1905a), Hewatt (1946), Schultz (1969), Miller (1975), Kussakin (1979), Lee and Miller (1980), SCAMIT (1994–2021), Chess and Hobson (1997), O’Clair and O’Clair (1998), Fairey et al. (2002), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), Brusca et al. (2007), Espinosa-Pérez et al. (2009), and Roletto et al. (2014).

*Paracerceis gilliana* (Richardson, 1899) [Fig. 21B] Subtidal, in sandy mud, and in bays on pilings, among mussel beds, and in association with hydroids, algae and ectoprocts (shallow to 73 m); Mendocino County, northern California, USA to Catalina Island, southern California, and south to Todos Santos Bay, Baja California Norte, Mexico. Type locality: USA, California, Catalina Island. Body length to ~ 4.8 mm. See Richardson (1899 original description as *Cilicaea caudata gilliana*; 1905a), Schultz (1969), Allen (1976), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), Campos and Villarreal (2008), and Espinosa-Pérez et al. (2009).

*Paracerceis sculpta* (Holmes, 1904) [Fig. 21C] Intertidal to shallow subtidal; Morro Bay, central California to San Diego, southern California, USA, and south to San Juan Alima, Michoacan, Mexico, including the entire Gulf of California, and also distributed throughout the world via oceanic shipping. Type locality: USA, California, from pieces of sponge dredged in shallow water at San Clemente Island. Body length to ~ 7.5 mm. See Holmes (1904 original description as *Dynamene sculpta*), Richardson (1905a), Menzies (1962a), Miller (1968), Schultz (1969), Brusca (1980), Shuster (1987, 1992), Shuster and Wade (1991a, 1991b), Rodríguez et al. (1992), SCAMIT (1994–2021), Shuster and Guthrie (1999), Espinosa-Pérez and Hendrickx (2001a, 2001b, 2006), Hewitt and Campbell (2001), Fairey et al. (2002), Smith et al. (2003), Ariyama and Otani (2004), Ranasinghe et al. (2003, 2005, 2007, 2012), Brusca et al. (2004, 2007), Healey and Hovel (2004), McLaughlin et al. (2005), Whitmore et al. (2005), Reed and Hovel (2006), Sirota and Hovel (2006), Montelli and Lewis (2008), Cruz-García et al. (2013), Munguia and Shuster (2013), Morales-Zarate et al. (2016), Gillett et al. (2017, 2022), Ramalhosa et al. (2017), Marchini et al. (2018), Rumbold et al. (2018), and Wetzer et al. (2018).

*Paracerceis* sp. A [Fig. 21D] Intertidal; La Jolla, southern California, USA to the central Gulf of California, Mexico. Body length = no information available. See Brusca (1980: species listed as *Paracerceis* sp.), SCAMIT (2008–2021), and Gillett et al. (2022). Note: Provisional species voucher sheet available at <https://www.scamit.org> (SCAMIT Newsletter, Vol. 15, No. 8, December 1996).

*Paradella dianae* (Menzies, 1962) [Fig. 22B] Intertidal to shallow subtidal; Ventura County, southern California, USA to San Juan de Alima, Michoacan, Mexico, including the Gulf of California, and widely introduced to ports around the world by international shipping. Type locality: Mexico, Baja California, Bahia de San Quintin. Body length to ~ 4 mm. See Menzies (1962a original description as *Dynamenopsis dianae*), Menzies and Glynn (1968), Schultz (1969), Iverson (1974), Allen (1976), Pires (1980), Kensley and Schotte (1989), Rodríguez et al. (1992), Espinosa-Pérez and Hendrickx (2001a, 2006), Bruce and Wetzer (2004),

McLaughlin et al. (2005), Brusca et al. (2007), Wetzer and Bruce (2007), Campos and Villarreal (2008), and SCAMIT (2008–2021).

*Pseudosphaeroma* sp. [No figure] Intertidal, bays and harbors; San Francisco and central California Coast regions, and Salinas de San Pedro, Los Angeles County, southern California, USA. Body length to 5.2 mm. See Bruce and Wetzer (2008) and references therein (e.g., Hurley and Jansen 1977; Harrison 1984), and additional information available from R Wetzer (unpublished results). Note: Species probably translocated to the SCB from the southern hemisphere (e.g., likely New Zealand). The most similar species is *P. campbellense*, but the present species concept includes more than one species (see Bruce and Wetzer 2008).

*Sphaeroma quoianum* H. Milne Edwards, 1840 [Fig. 20D] Intertidal to shallow subtidal, boring in wood, mud, and soft rocks; Humboldt County, northern California, USA to San Quintin Bay, Baja California Norte, Mexico, and in Australia and New Zealand (i.e., probably introduced to western North America in the late 1800's on ships from Australia). Type locality: Uncertain (i.e., not indicated in original description), but listed as Tasmania, Australia in Boyko et al. (2008 onwards). Body length to ~ 9.9 mm. See H. Milne Edwards (1840), Menzies (1962a, as *Sphaeroma pentodon*), Rotramel (1972), Iverson (1974), Carlton (1979), Kussakin (1979), Lee and Miller (1980), Carlton and Iverson (1981), Ricketts et al. (1985), Talley et al. (2001), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), Brusca et al. (2007), Davidson and de Rivera (2010), Davidson et al. (2010), SCAMIT (2011–2021), and Brown et al. (2022).

*Sphaeroma walkeri* Stebbing, 1905 [Fig. 20E] Intertidal to shallow water, common in fouling communities in warm to warm-temperate ports and harbors, and boring into wood or soft rocks; introduced species with a worldwide distribution, but occurring in at least San Diego Bay, southern California, USA. Type locality: Sri Lanka. Body length to ~ 9.5 mm. See Stebbing (1905), Menzies and Glynn (1968), Carlton and Iverson (1981), Mak et al. (1985), Kensley and Schotte (1989), Cohen et al. (2005), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), Brusca et al. (2007), Galil (2008), Montelli and Lewis (2008), Khalaji-Pirbalouty and Wägele (2010), Ramalhosa et al. (2017), and Ortiz and Lalana (2018).

## Family Tecticipitidae

*Tecticeps convexus* Richardson, 1899 [Fig. 18B] Low intertidal to shallow subtidal, on sandy, rocky bottoms; southern Washington State (northwest of Columbia River mouth) to Catalina Island, southern California, USA. Type locality: USA, California, Monterey Bay. Body length to ~ 11.5 mm. See Richardson (1899, 1900b, 1905a, 1906), Iwasa (1934), Schultz (1969), Iverson (1974), Miller (1975), Kuris and Carlton (1977), Higley and Holton (1978), Kussakin (1979), Lee and Miller (1980), Hinton and Emmett (1994, 1996), Hunt et al. (1999), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), Brusca et al. (2007), Espinosa-Pérez et al. (2009), and Looby and Ginsburg (2021).

**Suborder Valvifera**  
**Family Arcturidae**

*Idarcturus allelomorphus* Menzies & Barnard, 1959 [Fig. 25A] Continental shelf, soft-bottom substrates (12–94 m); Monterey, California, USA to Todos Santos Bay, Baja California Norte, Mexico. Type locality: USA, California, off Goleta (R/V Velero IV Station No. 4938-57; 34°27'25"N, 120°12'55"W). Body length to ~ 5.2 mm. See Menzies and Barnard (1959), Schultz (1969), Iverson (1974), Gillard (1978), Kussakin (1982), Dexter (1983), Lissner et al. (1986), Wetzer et al. (1991), SCAMIT (1994–2021), Wetzer and Brusca (1997), Bergen et al. (1998), Smith et al. (2001, 2003), Ranasinghe et al. (2003, 2007, 2012), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), Campos and Villarreal (2008), Espinosa-Pérez et al. (2009), Stebbins (2012a, 2012c), Gillett et al. (2017, 2022), and Kim and Yoon (2021).

*Idarcturus hedgpethi* Menzies, 1951 [Fig. 25B] Intertidal, on hydroids in laminarian zone at type locality; Strait of Georgia, British Columbia, Canada to Port Hueneme, southern California, USA. Type locality: USA, California, Marin County, Tomales Point, Tomales Bluff. Body length to ~ 4.2 mm. See Menzies (1951b), Schultz (1969), Miller (1975), Kussakin (1982), Wetzer and Brusca (1997), Fairey et al. (2002), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), Brusca et al. (2007), SCAMIT (2008–2021), Macdonald et al. (2010), Stebbins (2012a, 2012c), Gillett et al. (2017), and Kim and Yoon (2021). Note: See Endnote 20.

*Idarcturus* sp. A [No figure] Continental shelf, soft bottom substrates (18–95 m); northern Channel Islands and Western Santa Barbara Channel, southern California, USA. Body length to ~ 5.5 mm. Note: See Endnote 20.

*Neastacilla californica* (Boone, 1918) [Fig. 25C] Continental shelf, on seaweed and soft bottom benthos (subtidal to 99 m); Point Conception, California, USA to Guererro Negro Lagoon, Baja California Sur, Mexico, and in the Gulf of California. Type locality: USA, California, Venice. Body length to ~ 7.4 mm. See Boone (1918 original description as *Astacilla californica*), Menzies and Barnard (1959), Schultz (1969), Kussakin (1982), Thompson et al. (1993), SCAMIT (1994–2021), Hendrickx et al. (1997), Bergen et al. (1998), Espinosa-Pérez and Hendrickx (2001a, 2006), Smith et al. (2001, 2003), King (2003), Ranasinghe et al. (2003, 2007, 2012), McLaughlin et al. (2005), Melwani and Kim (2008), Stebbins (2012a, 2012c), Morales-Zarate et al. (2016), Gillett et al. (2017, 2022), and Mejía-Rebollo et al. (2018).

**Family Holognathidae**

*Cleantiooides occidentalis* (Richardson, 1899) [Fig. 25E] Low intertidal to subtidal, typically on sand and muddy-sand substrates (0–50 m); southern California, USA to Baja California Sur, Mexico, throughout the Gulf of California, and south to

Columbia and Ecuador, including the Galapagos Islands. Type locality: Mexico, Baja California Sur, Magdalena Bay. Body length to ~ 12.5 mm. See Richardson (1899 original description as *Cleantis occidentalis*; 1905a), Schultz (1969), Kensley and Kaufman (1978), Brusca and Wallerstein (1979a, 1979b), Brusca and Iverson (1985), Poore and Lew Ton (1990), Espinosa-Pérez and Hendrickx (2001a, 2002, 2006), McLaughlin et al. (2005), Brusca et al. (2007), Lazarus-Agudelo and Cantera-Kintz (2007), SCAMIT (2011–2021), Ranasinghe et al. (2012), Liu and Poore (2013), and Negromonte et al. (2022).

## Family Idoteidae

*Colidotea findleyi* Brusca & Wallerstein, 1977 [Fig. 27C] Low intertidal to shallow subtidal, common on fronds of the brown algae *Sargassum*; San Diego, California, USA (rare) to Guadalupe Island, Baja California Norte, and the Gulf of California, Mexico. Type locality: Mexico, Sonora, 5 miles north of Cabo Tepoca (Puerto Lobos) (~ 30°17'N; 112°50'W). Body length to ~ 24.5 mm. See Brusca and Wallerstein (1977, 1979b, 1982), Brusca (1980, 1983b), Wetzer et al. (1991), Espinosa-Pérez and Hendrickx (2001a, 2002, 2006), Brusca et al. (2004, 2007), Campos and Villarreal (2008), and Stebbins (2012a, 2012c).

*Colidotea rostrata* (Benedict, 1898) [Fig. 27D] Low intertidal to shallow subtidal, living as obligate commensal on sea urchins *Strongylocentrotus purpuratus* and *Mesocentrotus franciscanus*; Coos Bay, Oregon, USA to Baja California Norte, Mexico, but rare north of southern California. Type locality: USA, California, San Pedro. Body length to ~ 13.7 mm. See Benedict (1898 original description as *Idotea rostrata*), Richardson (1899, 1900b, 1905a), Shearer (1942), Hewatt (1946), Johnson and Snook (1967), Schultz (1969), Allen (1976), Brusca and Wallerstein (1979b), Lee and Miller (1980); Ricketts et al. (1985), Stebbins (1988a, 1988b, 1989, 2012a, 2012c), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), Brusca et al. (2007), and SCAMIT (2012–2021).

*Colidotea wallersteini* Brusca, 1983 [Fig. 27E] Intertidal; known only from two localities off the coast of Baja California Norte (i.e., Punta Clara and Guadalupe Island), Mexico. Type locality: Mexico, Baja California Norte, Punta Clara, south Rio Santo Tomás. Body length to ~ 16.5 mm. See Brusca (1983b), Wetzer et al. (1991), Espinosa-Pérez and Hendrickx (2002, 2006), McLaughlin et al. (2005), and Stebbins (2012a, 2012c).

*Edotea sublittoralis* Menzies & Barnard, 1959 [Fig. 27A] Continental shelf, typically occurring in sandy-silt benthic sediments (10–46 m, and one record > 100 m off San Diego); Vancouver Island, British Columbia to western Baja California Norte, Mexico, the Gulf of California (Bahia Concepcion), and one record off Costa Rica. Type locality: USA, California, off Newport (R/V Velero IV Station No. 4720-56; 33°37'39"N, 117°58'16"W). Body length to ~ 5.8 mm. See Menzies and Barnard (1959 original description as *Edotea sublittoralis*), Schultz (1969), Iverson (1974), Miller (1975), Brusca and Wallerstein (1979b), Kussakin (1982), Vargas-Zamora et

al. (1985), Rafi and Laubitz (1990), Wetzer et al. (1991), Thompson et al. (1993), Hinton and Emmett (1994, 1996), SCAMIT (1994–2021), Espinosa-Pérez and Hendrickx (2001a, 2006), Ranasinghe et al. (2003, 2007, 2012), McLaughlin et al. (2005), Campos and Villarreal (2008), Melwani and Kim (2008), Stebbins (2012a, 2012c), Lafferty and Suchanek (2016), Gillett et al. (2017, 2022), and Henkel et al. (2020). Note: See Endnote 21.

*Edotia* sp. B [Fig. 27B] Continental shelf, typically occurring in sandy-silt benthic sediments (24–62 m); southern California, USA to Baja California Norte, Mexico. Body length to ~ 4.1 mm. See Menzies and Barnard (1959, as *Edotea sublittoralis* in part), SCAMIT (1994–2021), Ranasinghe et al. (2003, 2007, 2012), Stebbins (2012a, 2012c), and Gillett et al. (2017). Note: See Endnote 21.

*Erichsonella crenulata* Menzies, 1950 [Fig. 26B] Intertidal to shallow subtidal, typically occurring on the eelgrass *Zostera marina*: Newport Bay, southern California to San Quintin Bay, Baja California Norte, Mexico. Type locality: USA, California, Orange County, Newport Bay. Body length to ~ 23 mm. See Menzies (1950b, 1962a), Schultz (1969), Allen (1976), Pires (1984), Wetzer et al. (1991), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), Brusca et al. (2007), Jorgensen et al. (2007), Ranasinghe et al. (2007, 2012), Campos and Villarreal (2008), SCAMIT (2008–2021), Stebbins (2012a, 2012c), and Gillett et al. (2017, 2022).

*Eusymmerus pseudoculata* (Boone, 1923) [Fig. 26C] Intertidal to subtidal (0–18 m); Point Conception, California to US-Mexico border. Type locality: USA, California, San Pedro. Body length to ~ 9 mm. See Boone (1923 original description as *Erichsonella pseudoculata*), Menzies and Bowman (1956 redescription as *Ronalea pseudoculata*), Menzies and Barnard (1959), Schultz (1969), Kussakin (1982), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), Brusca et al. (2007), Espinosa-Pérez et al. (2009), SCAMIT (2012–2021), and Stebbins (2012a, 2012c).

*Idotea fewkesi* Richardson, 1905 [Fig. 29A] Intertidal to shallow water (0–6 m); Alaska, USA to Guerrero Negro, Baja California Sur, Mexico. Type locality: USA, California, Santa Barbara. Body length to ~ 42 mm. See Richardson (1905a), Fee (1927), Shearer (1942), Hatch (1947), Menzies (1950a), Schultz (1969), Miller (1975), Brusca and Wallerstein (1979b), Lee and Miller (1980), Kussakin (1982), Rafi and Laubitz (1990), O'Clair and O'Clair (1998), SCAMIT (2001–2021), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), Brusca et al. (2007), Campos and Villarreal (2008), Espinosa-Pérez et al. (2009), Puget Sound Institute (2012–2023), Stebbins (2012a, 2012c), Roletto et al. (2014), Morales-Zarate et al. (2016), and Shaughnessy et al. (2017).

*Idotea metallica* Bosc, 1801 [Fig. 29B] Cosmopolitan pelagic species found attached to drifting seaweed, occasionally occurring in southern California and Gulf of California during warm water years. Type locality: Unknown to us (not indicated in original description). Body length to ~ 29 mm. See Bosc (1801), Miers (1881), Richardson (1900b, 1905a, 1909), Naylor (1957), Schultz (1969), Kussakin (1982), Poore and Lew Ton (1993), Franke et al. (1998), Abelló et al. (2004),

McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), Brusca et al. (2007), and Riera (2014). Note: Poore and Lew Ton (1993) provide a comprehensive synonymy and figures for *I. metallica*.

*Idotea rufescens* Fee, 1927 [Fig. 29C] Low intertidal to subtidal (0–82 m), occurring mostly on algae; Prince Williams Sound, Alaska, USA to western Baja California, Mexico, including Catalina and the Coronado Islands. Type locality: Canada, British Columbia, Gabriola Passage. Body length to ~ 20.6 mm. See Fee (1927), Hatch (1947), Menzies (1950a), Schultz (1969), Iverson (1974), Miller (1975), Kussakin (1982), Rafi and Laubitz (1990), Wetzer and Brusca (1997), O’Clair and O’Clair (1998), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), Brusca et al. (2007), SCAMIT (2008–2021), Macdonald et al. (2010), Stebbins (2012a, 2012c), and Shaughnessy et al. (2017).

*Idotea urotoma* Stimpson, 1864 [Fig. 29D] Intertidal to shallow subtidal (0–14 m); Alaska, USA to Todos Santos Bay, Baja California Norte, Mexico, and the Gulf of California. Type locality: USA, Washington, Puget Sound. Body length to ~ 26.5 mm. See Stimpson (1864), Richardson (1899, 1900b, 1905a), Shearer (1942), Hewatt (1946), Hatch (1947), Menzies (1950a), George and Strömborg (1968), Schultz (1969), Miller (1975), Allen (1976), Brusca and Wallerstein (1977, 1979b, 1982), Brusca (1980), Lee and Miller (1980), Kussakin (1982), Dexter (1983), Ricketts et al. (1985), Rafi and Laubitz (1990), O’Clair and O’Clair (1998), Espinosa-Pérez and Hendrickx (2001a, 2006), SCAMIT (2001–2021), McLaughlin et al. (2005), Brusca et al. (2007), Campos and Villarreal (2008), Macdonald et al. (2010), Stebbins (2012a, 2012c), and Roletto et al. (2014).

*Pentidotea aculeata* Stafford, 1913 [Fig. 30A] Intertidal; occurring in various habitats, including encrusting red algae (e.g., *Melobesia*) on the surfgrass *Phyllospadix*: British Columbia, Canada to Cedros Island, Baja California Norte, Mexico, and the Gulf of California. Type locality: USA, California, Laguna Beach, low tide. Body length to ~ 23 mm. See Stafford (1913b), Hewatt (1946), Menzies (1950a), George and Strömborg (1968), Schultz (1969), Miller (1975), Allen (1976), Brusca and Wallerstein (1977, 1979b, 1982), Brusca (1980), Lee and Miller (1980), Kussakin (1982), Espinosa-Pérez and Hendrickx (2001a, 2006), McLaughlin et al. (2005), Brusca et al. (2007), Campos and Villarreal (2008), SCAMIT (2011–2021), and Stebbins (2012a, 2012c).

*Pentidotea kirchanskii* (Miller & Lee, 1970) [Fig. 30B] Intertidal, commonly on surfgrass *Phyllospadix*; Oregon to southern California, USA. Type locality: USA, California, Monterey County, Pebble Beach, 17 Mile Drive at Seal Rock. Body length to ~ 21 mm. See Miller and Lee (1970 original description as *Idotea (Pentidotea) kirchanskii*), Miller (1975), Brusca and Wallerstein (1979b), Lee and Miller (1980), Kussakin (1982), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), Brusca et al. (2007), and Stebbins (2012a, 2012c).

*Pentidotea montereyensis* Maloney, 1933 [Fig. 30C] Intertidal to subtidal (0–109 m), common on surfgrass (*Phyllospadix* spp.) in shallow waters; Alaska, USA to western Baja California, Mexico. Type locality: USA, California, Monterey Bay. Body

length to ~ 28.3 mm. See Maloney (1933), Menzies (1950a), Schultz (1969), Iverson (1974), Miller (1975), Brusca and Wallerstein (1979b), Lee and Miller (1980), Kussakin (1982), Ricketts et al. (1985), Rafi and Laubitz (1990), SCAMIT (1994–2021), O’Clair and O’Clair (1998), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), Brusca et al. (2007), and Stebbins (2012a, 2012c).

*Pentidotea resecata* (Stimpson, 1857) [Fig. 30D] Intertidal to subtidal, frequently occurring in kelp and eelgrass beds; Alaska, USA to western Baja California Sur, Mexico, and to Mazatlán in the Gulf of California. Type locality: USA, Washington, Straits of Juan de Fuca, opposite Fort Townsend. Body length to ~ 57 mm. See Stimpson (1857 original description as *Idotea resecata*), Richardson (1899, 1900b, 1905a), Fee (1927), Hewatt (1946), Hatch (1947), Menzies and Waidzunas (1948), Menzies (1950a), George and Strömberg (1968), Schultz (1969), Iverson (1974), Miller (1975), Allen (1976), Brusca and Wallerstein (1977, 1979b, 1982), Brusca (1980), Lee and Miller (1980), Kussakin (1982), Ricketts et al. (1985), Rafi and Laubitz (1990), SCAMIT (1994–2021), Chess and Hobson (1997), O’Clair and O’Clair (1998), Espinosa-Pérez and Hendrickx (2001a, 2002, 2006), McLaughlin et al. (2005), Brusca et al. (2007), Campos and Villarreal (2008), Stebbins (2012a, 2012c), Roletto et al. (2014), and Shaughnessy et al. (2017).

*Pentidotea schmitti* (Menzies, 1950) [Fig. 30E] Intertidal to subtidal (0–73 m); Bering Sea to Punta Banda, Baja California Norte, Mexico. Type locality: USA, California, Marin County, Dillon Beach, Second Sled Road. Body length to ~ 35 mm. See Menzies (1950a original description as *Idotea (Pentidotea) schmitti*), Schultz (1969), Iverson (1974), Miller (1975), Brusca and Wallerstein (1979b), Kussakin (1982), Ricketts et al. (1985), Rafi and Laubitz (1990), Wetzer et al. (1991), O’Clair and O’Clair (1998), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), Brusca et al. (2007), Stebbins (2012a, 2012c), Roletto et al. (2014), and Lafferty and Suchanek (2016).

*Pentidotea stenops* (Benedict, 1898) [Fig. 30F] Intertidal to shallow subtidal, often occurring on the feather-boa kelp *Egregia menziesii*, surfgrass (*Phyllospadix* spp.), and algae-covered rocks; Alaska, USA to San Eugenio Point, Baja California Sur, Mexico, and the Gulf of California. Type locality: USA, California, Monterey. Body length to 60 mm. See Benedict (1898 original description as *Idotea stenops*), Richardson (1899, 1900b, 1905a), Shearer (1942), Hatch (1947), Menzies (1950a), George and Strömberg (1968), Schultz (1969), Iverson (1974), Miller (1975), Allen (1976), Brusca and Wallerstein (1977, 1979b, 1982), Brusca and Brusca (1978), Brusca (1980), Lee and Miller (1980), Kussakin (1982), Ricketts et al. (1985), O’Clair and O’Clair (1998), Espinosa-Pérez and Hendrickx (2001a, 2006), McLaughlin et al. (2005), Brusca et al. (2007), Campos and Villarreal (2008), Stebbins (2012a, 2012c), and Roletto et al. (2014).

*Pentidotea wosnesenskii* (Brandt, 1851) [Fig. 30G] Intertidal to subtidal (0–16 m); Aleutian Islands, Alaska, USA to southern California, plus a single record from off La Paz, Mexico in the Gulf of California. Type locality: Listed in Brandt (1851) as more than one site, including Sea of Okhotsk, Attu, Atcha, St. Paul, Kadjak, Sitka and the

northern California coast. Body length to ~ 40.2 mm. See Brandt (1851 original description as *Idotea wosnesenskii*), Richardson (1899, 1900b, 1905a), Fee (1927), Shearer (1942), Hatch (1947), Menzies (1950a), George and Strömberg (1968), Schultz (1969), Miller (1975), Brusca and Wallerstein (1977, 1979b, 1982), Brusca (1980), Lee and Miller (1980), Kussakin (1982), Ricketts et al. (1985), Rafi and Laubitz (1990), O’Clair and O’Clair (1998), Espinosa-Pérez and Hendrickx (2001a, 2006), McLaughlin et al. (2005), Brusca et al. (2007), Toft et al. (2008, 2010), Stebbins (2012a, 2012c), Roletto et al. (2014), and Lafferty and Suchanek (2016).

*Stenosoma wetzerae* (Ormsby, 1991) [Fig. 26A] Subtidal, occurring on brown algae *Sargassum palmeri* and *Cystoseira neglecta* (13 m); Catalina Island, California, USA, and Guaymas, Mexico in the Gulf of California (unpublished data). Type locality: USA, California, Catalina Island, Isthmus Reef (33°25.4'N; 118°30.8'W). Body length to ~ 10.6 mm. See Ormsby (1991 original description as *Synisoma wetzerae*), Hedo and Junoy (1999), Espinosa-Pérez and Hendrickx (2001a, 2006), Castellanos and Junoy (2005), McLaughlin et al. (2005), Santos et al. (2011), Stebbins (2012a, 2012c), Xavier et al. (2012), and Artüz and Kubanç (2015).

*Synidotea calcarea* Schultz, 1966 [Fig. 28A] Continental shelf, slope, and submarine canyons (54–1816 m); Tanner and Santa Rosa Canyons, southern California, USA. Type locality: USA, California, Tanner Canyon (R/V Velero IV Station No. 6833-60; 32°37'54"N, 118°58'40"W). Body length to ~ 6 mm. See Schultz (1966 original description, but with prior listing in Schultz 1964 a *nomen nudum*; 1969), Iverson (1972), Menzies and Miller (1972), Lissner et al. (1986), Wetzer et al. (1991), SCAMIT (1994–2021), Poore (1996), Wetzer and Brusca (1997), Moore (2004), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), Ranasinghe et al. (2007), Stebbins (2012a, 2012c), and Gillett et al. (2019). Note: See Endnote 22.

*Synidotea harfordi* Benedict, 1897 [Fig. 28B] Intertidal to shallow subtidal (0–12 m); Oregon, USA to western Baja California Sur, Mexico, the Gulf of California, one record from Costa Rica, and introduced to Japan. Type locality: Mexico, Baja California Sur, Magdalena Bay. Body length to ~ 17 mm. See Benedict (1897), Richardson (1899, 1905a), Schultz (1969), Menzies and Miller (1972), Miller (1975), Brusca and Wallerstein (1979b, 1982), Kussakin (1982), Vargas-Zamora et al. (1985), Poore (1996), Espinosa-Pérez and Hendrickx (2001a, 2006), SCAMIT (2001–2021), Moore (2004), McLaughlin et al. (2005), Brusca et al. (2007), Stebbins (2012a, 2012c), and Hendrickx (2018b).

*Synidotea magnifica* Menzies & Barnard, 1959 [Fig. 28C] Continental shelf (29–98 m); San Luis Obispo, California, USA to western Baja California Norte, Mexico. Type locality: USA, California, off Oceanside (R/V Velero IV Station No. 5108-57; 33°10'30"N, 117°25'25"W). Body length to ~ 6 mm. See Menzies and Barnard (1959), Schultz (1969), Iverson (1972, 1974), Menzies and Miller (1972), Kussakin (1982), Wetzer et al. (1991), SCAMIT (1994–2021), Poore (1996), Ranasinghe et al. (2003, 2007, 2012), Moore (2004), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), Campos and Villarreal (2008), Stebbins (2012a, 2012c), and Gillett et al. (2017, 2022). Note: See Endnote 22.

*Synidotea media* Iverson, 1972 [Fig. 28D] Continental shelf (depths to at least 183 m): Strait of Georgia, British Columbia, Canada to Santa Maria Basin, California, USA. Type locality: USA, California, Monterey County, southwest of Point Soberanes (between 36°25'7"N–36°26'23"N). Body length to ~ 8.7 mm. See Iverson (1972), Kussakin (1982), Lissner et al. (1986), SCAMIT (1994–2021), Poore (1996), Wetzer and Brusca (1997), Ranasinghe et al. (2003, 2007), Moore (2004), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), Macdonald et al. (2010), Stebbins (2012a, 2012c), and Henkel et al. (2020). Note: See Endnote 22.

## Family Thermoarcturidae

*Califarcturus tannerensis* (Schultz, 1966) [Fig. 25D] Continental basin and canyon benthos, green mud (1197–1335 m); Tanner Basin and Tanner Canyon, southern California, USA. Type locality: USA, California, Tanner Canyon (R/V Velero IV Station No. 6832-60; 32°33'36"N, 118°55'40"W). Body length to ~ 5.5 mm. See Schultz (1966 original description as *Microarcturus tannerensis*; 1969), Wetzer et al. (1991), Stebbins (2012a, 2012c), and Poore (2015: supplementary redescription). Note: The only previously known record for this species was the holotype collected in 1960 from the Tanner Canyon at depths between 1298–1320 m (see Schultz 1966 and Poore 2015). Depth range is herein slightly expanded based on additional specimens collected in 1971 and 1976, which were recently rediscovered in the Crustacea Collection of the Natural History Museum of Los Angeles County (Specimen Nos. 28303 and 28313; TDS, pers. obs.).

## Suborder Asellota

### Superfamily Janiroidea

#### Family Dendrationidae

*Acanthomunna tannerensis* Schultz, 1966 [Fig. 31A] Continental slope and submarine canyon benthos (570–813 m); southeast of Catalina Island and Tanner Canyon, southern California, USA. Type locality: USA, California, Tanner Canyon (R/V Velero IV Station No. 6833-60; 32°37'54"N, 118°58'40"W). Body length to ~ 3.5 mm. See Schultz (1966, 1969), Wetzer et al. (1991), Cohen (1998), McLaughlin et al. (2005), SCAMIT (2011–2021), Ranasinghe et al. (2012), and Golovan et al. (2018).

## Family Desmosomatidae

*Desmosoma* sp. A [Fig. 40A] Continental slope, soft bottom benthos (290 m); Santa Maria Basin off Point Buchon and Point Estero, San Luis Obispo County, California, USA (~ 89–110 km north of SCB northern boundary). Body length to ~ 2.2 mm. See Wilson (1997: 106–107, fig. 1.44, description and figures).

*Momedossa symmetrica* (Schultz, 1966) [Fig. 40B] Continental slope and submarine canyons (469–2955 m); Gulf of the Farallones, San Francisco, northern California to Tanner Canyon, southern California, USA. Type locality: USA, California, Tanner Canyon (R/V Velero IV Station No. 6836-60; 32°36'00"N, 119°05'18"W). Body length to ~ 3.2 mm. See Schultz (1966 original description as *Desmosoma symmetrica*), Lissner et al. (1986), Wetzer et al. (1991), Wilson (1997), Blake et al. (2009), and SCAMIT (2011–2021).

*Prochelator* sp. A [Fig. 40C] Continental shelf, slope, and basins (99–2955 m); Gulf of the Farallones, San Francisco, northern California to Santa Maria Basin off Purisima Point, Santa Barbara County, California, USA (~ 35 km north of SCB northern boundary). Body length to ~ 2.5 mm. See Wilson (1997: 108–109, fig. 1.45, description and figures), Blake et al. (2009), and SCAMIT (2001–2021). Note: Also see Lissner et al. (1986) for previous report of likely same species from the region.

## Family Haplomunnidae

*Haplomunna caeca* (Richardson, 1905) [Fig. 37] Abyssal seafloor (3998 m); ~ 210 km southwest of Santa Catalina Island, southern California, USA. Type locality: USA, southern California (Albatross Station No. 4390; 33°02'15"N, 120°42'W). Body length to ~ 7.7 mm (estimated). See Richardson (1905a original description as *Munna caeca*; 1908), Menzies (1962b), Wolff (1962), Wilson (1976), Poore (1984c), Cunha and Wilson (2003).

## Family Janiridae

*Caecianiopsis* sp. LA1 [Fig. 39B, image of representative species *C. psammophila*] Continental shelf benthos (95 m): off west end of San Miguel Island, southern California, USA. No body size information available, but a similar species from northern California (*C. psammophila* Menzies & Pettit, 1956) measured 1.8 mm in length. See Menzies and Pettit (1956: description of *C. psammophila*), SCAMIT (2001–2021), and Gillett et al. (2017). Note: See Endnote 28.

*Caecianiopsis* sp. LA2 [Fig. 39B, image of representative species *C. psammophila*] Continental shelf benthos, coarse sediments (27 m): offshore Palos Verdes, southern California, USA. No body size information available other than similar in size to *Caecianiopsis* sp. LA1 (see preceding species). See Menzies and Pettit (1956: description of *C. psammophila*), SCAMIT (2001–2021), Ranasinghe et al. (2012), and Gillett et al. (2017, 2022). Note: See Endnote 28.

*Caecijaera horvathi* Menzies, 1951 [Fig. 39A] Intertidal, in burrows excavated in wood by the isopods *Limnoria* spp.; southern California, USA, and Hawaii. Type locality: USA, California, Los Angeles-Long Beach Harbor, Terminal Island. Body length to ~ 1.7 mm. See Menzies (1951c), Schultz (1969), Cooke (1977), Wetzer et al. (1991), Wilson and Wägele (1994), Espinosa-Pérez and Hendrickx (2006), Brusca et al. (2007), and Ruiz et al. (2011).

*Iais californica* (Richardson, 1904) [Fig. 31B] Shallow water bays and estuaries, commensal with the wood-boring isopod *Sphaeroma quoianum*; Humboldt Bay, northern California to San Diego, southern California, USA, introduced from Australia or New Zealand, also in Singapore. Type locality: USA, California, Sausalito. Body length to ~ 2.9 mm. See Richardson (1904a original description as *Janiropsis californica*), Menzies and Barnard (1951), Schultz (1969), Rotramel (1972, 1975), Iverson (1974), Miller (1975), Kussakin (1988), Espinosa-Pérez and Hendrickx (2006), Brusca et al. (2007), Espinosa-Pérez et al. (2009), and Ruiz et al. (2011).

*Janiropsis analoga* Menzies, 1952 [Fig. 34A] Intertidal, under rocks or amongst *Laminaria* holdfasts; San Juan Archipelago, Washington to Los Angeles Harbor, southern California, USA. Type locality: USA, California, Marin County, Tomales Point (bay side). Body length to ~ 3.7 mm. See Menzies (1952), George and Strömberg (1968), Schultz (1969), Miller (1975), Kussakin (1988), Wetzer et al. (1991), Fairey et al. (2002), Espinosa-Pérez and Hendrickx (2006), Brusca et al. (2007), SCAMIT (2008–2021), Doti and Wilson (2010), Lafferty and Suchanek (2016), and Gillett et al. (2017, 2022).

*Janiropsis derjugini* Gurjanova, 1933 [Fig. 34B] Intertidal, under rocks covered by algae; Bering Sea to southern California, USA, and Korea (Korea Strait and East Sea). Type locality: Bering Sea. Body length to ~ 4.8 mm. See Gurjanova (1933 original description as *Janiropsis derjugini*), Miller (1975), Kussakin (1988), Jang and Kwon (1990), Wilson (1994), Espinosa-Pérez and Hendrickx (2006), Brusca et al. (2007), Doti and Wilson (2010), and SCAMIT (2011–2021).

*Janiropsis kincaidi* Richardson, 1904 [Fig. 34C] Intertidal; Bering Sea to Catalina Island and Los Angeles Harbor, southern California, USA. Type locality: USA, Alaska, Yakutat Bay. Body length to ~ 3.8 mm. See Richardson (1904b), George and Strömberg (1968), Schultz (1969), Miller (1975), Kussakin (1988), Jang and Kwon (1990), Wilson (1994), Fairey et al. (2002), Espinosa-Pérez and Hendrickx (2006), Brusca et al. (2007), Espinosa-Pérez et al. (2009), Doti and Wilson (2010), Macdonald et al. (2010), Roletto et al. (2014), Lafferty and Suchanek (2016), and Looby and Ginsburg (2021).

*Janiropsis minuta* Menzies, 1952 [Fig. 34D] Intertidal, under rocks or sand; Marin County, northern California to southern California, USA. Type locality: USA, California, Marin County, Dillon Beach, Second Sled Road. Body length to ~ 1.3 mm. See Menzies (1952), Schultz (1969), Miller (1975), Lissner et al. (1986), Kussakin (1988), Espinosa-Pérez and Hendrickx (2006), Brusca et al. (2007), Doti and Wilson (2010), and SCAMIT (2011–2021).

*Janiropsis montereyensis* Menzies, 1952 [Fig. 34E] Intertidal to shallow subtidal, under rocks or in *Macrocystis* holdfasts; Marin County, northern California to southern California, USA. Type locality: USA, California, Monterey County, Pescadero Point. Body length to ~ 3.6 mm. See Menzies (1952), Schultz (1969), Miller (1975), Kussakin (1988), Wetzer et al. (1991), Espinosa-Pérez and Hendrickx (2006), Brusca et al. (2007), Espinosa-Pérez et al. (2009), Doti and Wilson (2010), and SCAMIT (2011–2021).

*Ianiropsis tridens* Menzies, 1952 [Fig. 34F] Intertidal, on algae or occasionally in sponges; Strait of Georgia, British Columbia, Canada to Oceanside, southern California, USA, Peru, northern Chile, and Korea (Korea Strait and East Sea). Type locality: USA, California, Marin County, Tomales Point (bay side). Body length to ~ 3 mm. See Menzies (1952, 1962b), George and Strömberg (1968), Schultz (1969), Miller (1975), Kussakin (1988), Jang and Kwon (1990), Wetzer et al. (1991), Fairey et al. (2002), Cohen et al. (2005), Espinosa-Pérez and Hendrickx (2006), Brusca et al. (2007), SCAMIT (2008–2021), Doti and Wilson (2010), Macdonald et al. (2010), Gillett et al. (2017), and Zúñiga Delgado et al. (2021).

*Janiralata davisi* Menzies, 1951 [Fig. 33A] Low intertidal, under rocks; Monterey County, California, USA to Todos Santos Bay, Baja California Norte, Mexico. Type locality: USA, California, Monterey County, Carmel Cove. Body length to ~ 4.7 mm. See Menzies (1951b), Miller (1975), Kussakin (1988), Wetzer et al. (1991), Espinosa-Pérez and Hendrickx (2006), Brusca et al. (2007), and Campos and Villarreal (2008).

*Janiralata occidentalis* (Walker, 1898) [Fig. 33B] Intertidal, under rocks; Strait of Georgia, British Columbia, Canada to Orange County, southern California, USA. Type locality: USA, Washington, Puget Sound. Body length to ~ 6 mm. See Walker (1898 original description as *Janira occidentalis*), Richardson (1899, 1905a), Stafford (1913b), Hatch (1947), Menzies and Barnard (1959), George and Strömberg (1968), Schultz (1969), Miller (1975), Kussakin (1988), SCAMIT (1994–2021), Bergen et al. (1998), Espinosa-Pérez and Hendrickx (2006), Brusca et al. (2007), Ranasinghe et al. (2007), and Macdonald et al. (2010).

*Janiralata rajata* Menzies, 1951 [Fig. 33C] Subtidal (1–36 m); Monterey Bay, California to Anacapa and Catalina Islands, southern California, USA. Type locality: USA, California, Monterey Bay (from eggcase of the skate *Raja binoculata*). Body length to ~ 4 mm. See Menzies (1951b), Miller (1968), Schultz (1969), Miller (1975), Kussakin (1988), and Espinosa-Pérez and Hendrickx (2006). Note: See Endnote 24.

*Janiralata solasteri* (Hatch, 1947) [Fig. 33D] Subtidal (50–218 m): Dall Island, Gulf of Alaska to southern California, USA. Type locality: USA, Washington, Hood Canal, on the sea star *Solaster stimpsoni*. Body length to ~ 5 mm. See Hatch (1947 original description as *Janira solasteri*), Menzies and Barnard (1959), Schultz (1966, 1969), George and Strömberg (1968), Miller (1975), Lissner et al. (1986), Kussakin (1988), SCAMIT (1994–2021), Bergen et al. (1998), Espinosa-Pérez and Hendrickx (2006), Ranasinghe et al. (2007), Espinosa-Pérez et al. (2009), Macdonald et al. (2010), and Puget Sound Institute (2012–2023).

*Janiralata* sp. A [Fig. 33E] Continental shelf (160–168 m); Santa Maria Basin, southern California, USA. Body length ~ 4.4 mm. See Wilson (1997: 80–82, fig. 1.31, description and figures), SCAMIT (2011–2021), and Ranasinghe et al. (2012).

*Janiralata* sp. B [Fig. 33F] Continental shelf and upper slope (168–237 m); Santa Maria Basin, southern California, USA. Body length ~ 4.8 mm. See Wilson (1997: 82–84, fig. 1.32, description and figures), Ranasinghe et al. (2007), and SCAMIT (2008–2021).

*Janiralata* sp. C [Fig. 33G] Continental shelf, hard bottom benthos (91–123 m); Santa Maria Basin offshore of Purisima Point, Santa Barbara County, California, USA (~ 35 km north of SCB northern boundary). Body length ~ 2.4 mm. See Wilson (1997: 84–85, fig. 1.33, description and figures).

*Janiralata* sp. D [Fig. 33H] Continental shelf, hard bottom benthos (91–123 m); Santa Maria Basin offshore of Purisima Point, Santa Barbara County, California, USA (~ 35 km north of SCB northern boundary). Body length ~ 3.5 mm. See Wilson (1997: 86–87, fig. 1.34, description and figures) and SCAMIT (2008–2021). Note: See Endnote 24.

## Family *Joeropsididae*

*Joeropsis concava* Schultz, 1966 [Fig. 32A] Continental shelf and submarine canyons, coarse sediments (60–221 m); Central California to San Diego, southern California, USA. Type locality: USA, California, Santa Cruz Canyon (R/V Velero IV Station No. 6806-59; 33°56'06"N, 118°52'17"W). Body length to ~ 4.2 mm. See Schultz (1966, 1969), Wetzer et al. (1991), Wilson (1997), SCAMIT (1994–2021), Ranasinghe et al. (2003, 2007, 2012), Espinosa-Pérez and Hendrickx (2006), Espinosa-Pérez et al. (2009), and Gillett et al. (2017, 2022).

*Joeropsis dubia dubia* Menzies, 1951 [Fig. 32B] Low intertidal to offshore shelf and submarine canyons, often occurring under rocks, in algal holdfasts, and on bryozoans, tunicates, hydroids and barnacles (0–116 m); Strait of Georgia, British Columbia, Canada to San Quintin Bay, Baja California Norte, the Gulf of California, and western Mexico (i.e., Bahia de Banderas, Nayarit). Type locality: USA, California, Marin County, Dillon Beach, First Sled Road north of Pacific Marine Station. Body length to ~ 2.8 mm. See Menzies (1951b original description as *Jaeropsis dubia*; 1962a), Menzies and Barnard (1959), Schultz (1966, 1969), Miller (1968, 1975), Carvacho (1983), Lissner et al. (1986), Wetzer et al. (1991), Thompson et al. (1993), SCAMIT (1994–2021 as *J. dubia*), Kussakin (1999), Espinosa-Pérez and Hendrickx (2001a, 2006), Smith et al. (2001, 2003), Ranasinghe et al. (2003, 2007, 2012), Brusca et al. (2007), Campos and Villarreal (2008), Macdonald et al. (2010), Puget Sound Institute (2012–2023), Cruz-García et al. (2013), Lafferty and Suchanek (2016), and Gillett et al. (2017, 2019, 2022). Note: If confirmed as *J. dubia dubia*, the Gillett et al. (2019) record extends the maximum depth range of this species from 116 m to the lower slope between 500–1000 m.

*Joeropsis dubia paucispinis* Menzies, 1951 [Fig. 32C] Intertidal to offshore shelf and submarine canyons (0–116 m); Marin County, northern California to Santa Monica Canyon, southern California, USA. Type locality: USA, California, Marin County, Dillon Beach. Body length < 3 mm. See Menzies (1951b original description as *Jaeropsis dubia paucispinis*; 1962a), Menzies and Barnard (1959), Schultz (1966, 1969), Miller (1968, 1975), Kussakin (1999), Espinosa-Pérez and Hendrickx (2006), Brusca et al. (2007), and Espinosa-Pérez et al. (2009).

*Joeropsis lobata* Richardson, 1899 [Fig. 32D] Intertidal to shallow water; Coos Bay, Oregon to southern California, USA, plus one recent record from Namhyeongjeseom Islet, Busan, Republic of Korea (see Hwang et al. 2014) that should be further studied to verify. Type locality: USA, California, Monterey Bay. Body length to ~ 3.5 mm. See Richardson (1899, 1900c, 1905a), Shearer (1942), Hatch (1947), Schultz (1969), Miller (1975), Bergen et al. (1998), Kussakin (1999), Espinosa-Pérez and Hendrickx (2006), Brusca et al. (2007), SCAMIT (2008–2021), and Espinosa-Pérez et al. (2009).

*Joeropsis* sp. A [Fig. 32E] Continental shelf, hard bottom benthos (54–131 m); Santa Maria Basin offshore of Point Arguello and Purisima Point, Santa Barbara County, California, USA (~ 30–35 km north of SCB northern boundary). Body length ~ 2.8 mm. See Wilson (1997: 90–91, fig. 1.36, description and figures).

## Family Lepidocharontidae

*Microcharon* sp. A [Fig. 39C, image of representative species *M. sabulum*] Continental shelf benthos (75 m); Channel Islands, southern California, USA. No body size information available, but a similar species from the Caribbean listed in Kensley and Schotte (1989), *M. sabulum*, measured ~ 1.5 mm in length. See Kensley and Schotte (1989), Ranasinghe et al. (2012), and SCAMIT (2012–2021). Note: See Endnote 27.

## Family Munnidae

*Munna chromatocephala* Menzies, 1952 [Fig. 36A] Intertidal, on red algae and encrusting organisms on rocks; Strait of Georgia, British Columbia, Canada to central and southern California, USA. Type locality: USA, California, Marin County, Dillon Beach, First Sled Road. Body length to ~ 2.2 mm. See Menzies (1952), George and Strömberg (1968), Schultz (1969), Miller (1975), Poore (1984c), Kussakin (1988), Wetzer et al. (1991), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), Brusca et al. (2007), SCAMIT (2008–2021), Espinosa-Pérez et al. (2009), Macdonald et al. (2010), and Lafferty and Suchanek (2016).

*Munna fernaldi* George & Strömberg, 1968 [Fig. 36B] Intertidal, from stones and algae; San Juan Archipelago, Washington to southern California, USA. Type locality: USA, Washington, San Juan Archipelago, San Juan Island, Friday Harbor. Body length to ~ 1.5 mm. See George and Strömberg (1968), Schultz (1969), Poore (1984c), Kussakin (1988), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), Puget Sound Institute (2012–2023), and SCAMIT (2012–2021).

*Munna halei* Menzies, 1952 [Fig. 36C] Intertidal to shallow subtidal, under rocks, in *Macrocystis* holdfasts, and among spines of the purple sea urchin *Strongylocentrotus purpuratus*; Tomales Bay, northern California to southern California, USA. Type locality: USA, California, Marin County, Tomales Point, Tomales Bluff. Body length to ~ 1.5 mm. See Menzies (1952), Schultz (1969), Iverson (1974), Miller (1975), Harty (1979), Poore (1984c), Kussakin (1988), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), Brusca et al. (2007), and SCAMIT (2011–2021).

*Munna magnifica* Schultz, 1964 [Fig. 36D] Offshore continental slope, black mud, nodules, and flat shaley rocks (500 m); southern California, USA. Known only from the type material. Type locality: USA, California, 13.1 miles WNW of Santa Barbara Island (R/V Velero IV Station No. 2969-54; 33°35'59"N, 119°15'11"W). Body length to ~ 2 mm. See Schultz (1964, 1969), Wilson (1980), Poore (1984c), Wetzer et al. (1991), and McLaughlin et al. (2005).

*Munna spinifrons* Menzies & Barnard, 1959 [Fig. 36E] Offshore continental shelf; 12–218 m: Point Conception to Point Loma, San Diego, southern California, USA. Type locality: USA, California, 11 miles east of Point Conception (R/V Velero IV Station No. 4822-57; 34°27'15"N, 120°14'45"W). Body length to ~ 1.5 mm. See Menzies and Barnard (1959), Schultz (1966, 1969), Poore (1984c), Kussakin (1988), Wetzer et al. (1991), SCAMIT (1998–2021), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), and Espinosa-Pérez et al. (2009).

*Munna stephensi* Gurjanova, 1933 [Fig. 36F] Intertidal to shallow subtidal (0–18 m); Bering Sea to central and southern California, USA, and Japan. Type locality: Bering Sea, Komador Islands. Body length to ~ 3 mm. See Gurjanova (1933), Schultz (1969), Miller (1975), Poore (1984c), Kussakin (1988), SCAMIT (1994–2021), Shimomura and Mawatari (2001), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), and Brusca et al. (2007). Note: See Shimomura and Mawatari (2001) for a brief discussion of differences between California and Japanese specimens of *M. stephensi*.

*Munna* sp. A [Fig. 36G] Continental shelf and upper slope, hard substrates (105–237 m); Santa Maria Basin, southern California, USA. Body length to ~ 1.5 mm. See Wilson (1997: 71–72, fig. 1.27, description and figures), Espinosa-Pérez and Hendrickx (2006), Ranasinghe et al. (2007), and SCAMIT (2008–2021). Note: See Lissner et al. (1986) for previous report of likely same species from the region.

*Uromunna ubiquita* (Menzies, 1952) [Fig. 36H] Intertidal to shallow subtidal; Strait of Georgia, British Columbia, Canada to San Quintin Bay, Baja California Norte, and the Gulf of California, Mexico. Type locality: USA, California, Marin County, Tomales Bay. Body length to ~ 1.2 mm. See Menzies (1952 original description as *Munna ubiquita*; 1962a), Menzies and Barnard (1959), George and Strömberg (1968), Schultz (1969), Miller (1975), Carvacho (1983), Poore (1984c), Kussakin (1988), Wetzer et al. (1991), SCAMIT (1994–2021), Chess and Hobson (1997), Espinosa-Pérez and Hendrickx (2001a, 2006), Ranasinghe et al. (2003, 2012), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), Brusca et al. (2007), Macdonald et al. (2010), Puget Sound Institute (2012–2023), Esquete and Wilson (2016), and Gillett et al. (2017, 2022).

## Family Munnopsidae

*Belonectes* sp. A [Fig. 38A] Continental slope and submarine canyons (305–401 m); Santa Maria Basin to La Jolla Canyon, southern California, USA. Body length to ~ 2.1 mm. See SCAMIT (1994–2021), Wilson (1997: 94–95, fig. 1.38, description and figures), and Gillett et al. (2017, 2019). Note: If confirmed, the Gillett et

al. (2019) record extends the maximum depth range of this species slightly from 401 m to the lower slope between 500 and 1000 m.

*Eurycope californiensis* Schultz, 1966 [Fig. 38B] Continental slope (478–930 m); Santa Maria Basin to Newport Canyon, southern California, USA. Type locality: USA, California, Newport Canyon (R/V Velero IV Station No. 7032-60; 33°31'28"N, 117°54'58"W). Body length to ~ 3.5 mm. See Schultz (1966, 1969), Gillard (1978), Lissner et al. (1986), Wetzer et al. (1991), Wilson (1997), McLaughlin et al. (2005), Ranasinghe et al. (2007, 2012), SCAMIT (2008–2021), and Gillett et al. (2017, 2019, 2022).

*Ilyarachna acarina* Menzies & Barnard, 1959 [Fig. 38C] Continental shelf, slope, and submarine canyons (73–1118 m, and possibly > 2100 m per ‘Note’ below); San Francisco, northern California to San Diego, southern California, USA (including Santa Maria Basin, and Coronado, Redondo, San Pedro, Santa Cruz, and Santa Monica canyons). Type locality: USA, California, off Santa Barbara (R/V Velero IV Station No. 4980-57; 34°15'50"N, 119°34'28"W). Body length to ~ 4.3 mm. See Menzies and Barnard (1959), Schultz (1964, 1966, 1969), Hessler and Thistle (1975), Gillard (1978), Thistle (1979), Lissner et al. (1986), Wetzer et al. (1991), SCAMIT (1994–2021), Wilson 1997, Bergen et al. (1998), Smith et al. (2001, 2003), Kussakin (2003), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), Ranasinghe et al. (2007, 2012), Blake et al. (2009), Espinosa-Pérez et al. (2009), and Gillett et al. (2017, 2019, 2022). Note: San Francisco specimens identified as *Ilyarachna* cf. *acarina* were collected from a subset of lower slope stations ranging between 2160–3140 m in depth (see Blake et al. 2009).

*Ilyarachna profunda* Schultz, 1966 [Fig. 38D] Continental slope, basins, and submarine canyons (461–1670 m, and possibly > 2100 m per ‘Note’ below), extremely abundant on whale falls (skeletons); San Francisco, northern California to San Diego, southern California, USA (including Santa Cruz Basin, La Jolla, San Pedro, Santa Catalina and Tanner canyons). Type locality: USA, California, La Jolla Canyon (R/V Velero IV Station No. 7047-60; 32°54'21"N, 117°29'53"W). Body length to ~ 3.8 mm. See Schultz (1966, 1969), Hessler and Thistle (1975), Thistle (1979), Wetzer et al. (1991), Wilson (1997), Smith and Baco (2003), McLaughlin et al. (2005), Ranasinghe et al. (2007, 2012), SCAMIT (2008–2021), Blake et al. (2009), Bernardino et al. (2010), and Gillett et al. (2019, 2022). Note: San Francisco specimens identified as *Ilyarachna* cf. *profunda* were collected from a subset of lower slope stations ranging between 2160–3140 m in depth (see Blake et al. 2009).

*Munnopsurus* sp. A [Fig. 38E] Continental slope and submarine canyons (393–582 m); Santa Maria Basin to La Jolla Canyon, southern California, USA. Body length to ~ 1.8 mm. See Wilson (1997: 98–99, fig. 1.40, description and figures), SCAMIT (1998–2021), Ranasinghe et al. (2012), and Gillett et al. (2019). Note: See Lissner et al. (1986) for previous report of likely same species from the region.

*Munnopsurus* sp. B [Fig. 38F] Continental slope, soft bottom benthos (930 m); Santa Maria Basin west of Point Conception, Santa Barbara County, California, USA. Body length to ~ 7 mm. See Wilson (1997: 100–101, fig. 1.41, description and figures).

## Family Nannoniscidae

*Nannonisconus latipleonus* Schultz, 1966 [Fig. 40D] Continental slope and submarine canyons (294–465 m); Western Santa Barbara Channel off Point Conception to Redondo Canyon, southern California, USA. Type locality: USA, California, Redondo Canyon (R/V Velero IV Station No. 2793-54; 33°48'00"N, 118°32'00"W). Body length to ~ 2.8 mm. See Schultz (1966, 1969), Siebenaller and Hessler (1981), Lissner et al. (1986), Wetzer et al. (1991), Wilson (1997, 2008b), and McLaughlin et al. (2005). Note: Wilson (1997) briefly discusses that *N. latipleonus* may be conspecific with the more northern *N. carinatus* Mezhov, 1986. If true, this will extend the geographic range of *N. latipleonus* to Alaska Bay in the northeast Pacific.

## Family Paramunnidae

*Austrosignum latum* Just & Wilson, 2021 [Fig. 35A] Subtidal benthos (20 m); La Jolla Canyon, southern California, USA. Type locality: USA, California, La Jolla (32°52.09'N, 117°15.69'W). Body length to ~ 2 mm. See Just and Wilson (2021) for original description and comparison with other species of the genus.

*Boreosignum* sp. A [Fig. 35B] Shallow subtidal rocks (9–16 m); Point La Jolla to Pin Rock, Catalina Island, southern California, USA. Body length < 1 mm. See Cadien (2008: voucher sheet for *Boreosignum* sp. IS1 available from SCAMIT Toolbox at <https://www.scamit.org>; specimens examined 5 April 2008, D. B. Cadien), Maloney et al. (2008), and SCAMIT (2012–2021).

*Munnogonium erratum* (Schultz, 1964) [Fig. 35C] Continental shelf (98–158 m); Morro Bay, central California to Santa Maria Basin, southern California, USA. Type locality: USA, California, Santa Barbara County, 4.6 miles 137 degrees from Gaviota Pier (R/V Velero IV Station No. 6003-58; 34°24'45"N, 120°08'40"W). Body length to ~ 1.8 mm. See Schultz (1964 original description as *Austrosignum erratum*; 1969), Bowman and Schultz (1974), Lissner et al. (1986), Wetzer et al. (1991), SCAMIT (1994–1996), Wilson (1997, as *Munnogonium* cf. *tillerae*), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), Just and Wilson (2021: comparison to redescribed *M. tillerae*), and Golovan and Malyutina (2022).

*Munnogonium tillerae* (Menzies & Barnard, 1959) [Fig. 35D] Continental shelf (101–127 m); San Diego, southern California, USA. Type locality: USA, California, off Point Loma (R/V Velero IV Station No. 4753-56; 32°41'50"N, 117°20'25"W). Body length to ~ 1.3 mm. See Menzies and Barnard (1959 original description as *Austrosignum tillerae*), Schultz (1969), Bowman and Schultz (1974), Lissner et al. (1986), Kussakin (1988), Wetzer et al. (1991), SCAMIT (1994–2021), Wilson (1997: but not *M. cf. tillerae* [see *M. erratum* above]), Bergen et al. (1998), Smith et al. (2001, 2003), Ranasinghe et al. (2003, 2007, 2012), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), Brusca et al. (2007), Gillett et al. (2017, 2019, 2022), Just and Wilson (2021: redescription, range restriction, and comparison to *M. erratum*), and Golovan and Malyutina (2022).

*Paramunna quadratifrons* Iverson & Wilson, 1981 [Fig. 41A] Continental shelf (197 m); southern Channel Islands and Tanner bank, southern California, USA. Type locality: USA, California, Tanner Bank, ~ 160 kilometers southwest of Los Angeles (33°53.24'N; 119°23.35'W). Body length to ~ 1.3 mm. See Iverson and Wilson (1981), Wetzer et al. (1991), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), SCAMIT (2011–2021), Ranasinghe et al. (2012), and Golovan and Malyutina (2022).

*Paramunna* sp. A [Fig. 41B] Continental shelf (100 m); off Del Mar, San Diego County, southern California, USA. Body length to ~ 1 mm. See Cadien (1996: voucher sheet available [in part] in SCAMIT Newsletter Vol. 15, No. 2 at <https://www.scamit.org>; specimens examined 30 May 1996, D. Cadien) and SCAMIT (2013–2021).

*Paramunna* sp. SD1 [No figure] Channel Island shelf (75 m); NE Anacapa Island, southern California, USA. No body size information available. See Ranasinghe et al. (2007) and SCAMIT (2008–2021). Note: Provisional species designation based on diagnostic notes for “Asellota sp. SD1” drafted by D. Pasko in 2004 (see Endnote 29).

*Pleurogonium californiense* Menzies, 1951 [Fig. 41C] Continental shelf, slope and submarine canyons, benthic sediments (93–150 m, and possibly > 2100 m as per ‘Note’ below); Strait of Georgia, British Columbia, Canada to Point Loma, San Diego, southern California, USA. Type locality: USA, California, Sonoma County, 3 miles west of mouth of Russian River. Body length to ~ 1.3 mm. See Menzies (1951b), Menzies and Barnard (1959), Schultz (1966, 1969), Lissner et al. (1986), Kussakin (1988), SCAMIT (1994–2021), Bergen et al. (1998), Smith et al. (2001, 2003), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), Ranasinghe et al. (2007, 2012), Blake et al. (2009), Macdonald et al. (2010), Gillett et al. (2017, 2019, 2022), and Golovan and Malyutina (2022). Note: If confirmed, the Gillett et al. (2019) record extends the maximum depth range of this species slightly from 150 m to the upper slope between 200–500 m. Additionally, San Francisco specimens identified as *Pleurogonium* cf. *californiense* were collected from a subset of lower slope stations ranging between 2160–3140 m in depth as reported by Blake et al. (2009), thus extending this bathymetric range into even deeper waters.

*Pleurogonium* sp. A [Fig. 41D] Continental shelf benthos (90–154 m); Santa Maria Basin to San Diego, southern California, USA. Body length to ~ 1.6 mm. See Wilson (1997: 78–79, fig. 1.30, description and figures), Bergen et al. (1998), SCAMIT (1994–2021), Ranasinghe et al. (2007, 2012), and Gillett et al. (2019, 2022). Note: If confirmed, the Gillett et al. (2019) record extends the maximum depth range of this species slightly from 154 m to the upper slope between 200–500 m.

## Family Pleurocopidae

*Pleurocope* sp. A [Fig. 35E] Shallow water fouling communities (0.5 m); Central California to Avalon Harbor, Catalina Island and Point Loma, San Diego, southern California, USA. Body length to ~ 1.2 mm. See Cadien (2012: voucher sheet for original provisional species designation *Pleurocope* sp. IS1 available from TD Stebbins;

specimens examined 4 March 2012, DB Cadien), SCAMIT (2012–2021), and prior SCB reports of *P. floridensis* in Maloney et al. (2006, 2008). Note: See Endnote 25.

## **Superfamily Stenetrioidea**

### **Family Stenetriidae**

*Stenetrium* sp. A [Fig. 31C] Continental shelf, hard bottom benthos (90–131 m); Santa Maria Basin offshore of Purisima Point, Santa Barbara County, California, USA (~ 35 km north of SCB northern boundary). Body length to ~ 7.3 mm. See Wilson (1997: 69–70, fig. 1.26, description and figures). Note: See Lissner et al. (1986) for previous report of likely same species from the region.

## **Suborder Oniscidea**

### **Superfamily Oniscoidea**

#### **Family Alloniscidae**

*Alloniscus mirabilis* (Stuxberg, 1875) [Fig. 43A] Littoral halophilic species common on sandy beaches, burrows into sand under driftwood above high tide line (may co-occur with *A. perconvexus*); San Mateo County, northern California, USA to Magdalena Bay, Baja California Sur, Mexico. Type locality: USA, California. Body length to ~ 9.4 mm. See Stuxberg (1875 original description as *Rhinoryctes mirabilis*), Richardson (1899, 1900c, 1905a), Stafford (1913a as *A. cornutus* var. *lagunae*), Schultz (1984), Garthwaite and Lawson (1992), Leistikow and Wägele (1999), Jass and Klausmeier (2000, 2001), Schmalfuss (2003), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), Brusca et al. (2007), and Campos-Filho et al. (2018).

*Alloniscus perconvexus* Dana, 1854 [Fig. 43B] Littoral halophilic species common on sandy beaches, burrows into sand under driftwood above most recent high tide line (may co-occur with *A. mirabilis* or *Tylos punctatus* in southern California); British Columbia, Canada to Magdalena Bay, Baja California Sur, Mexico. Type locality: USA, California. Body length to ~ 12 mm. See Dana (1854), Richardson (1899, 1900c, 1905a), Shearer (1942), Hewatt (1946), Hatch (1947), Brusca (1966), George and Strömberg (1968), Miller (1975), Lee and Miller (1980), Schultz (1984), Ricketts et al. (1985), Garthwaite and Lawson (1992), Leistikow and Wägele (1999), Jass and Klausmeier (2000, 2001), Espinosa-Pérez and Hendrickx (2001a, 2006), Schmalfuss (2003), McLaughlin et al. (2005), Brusca et al. (2007), SCAMIT (2011–2021), Hubbard et al. (2014), Campos-Filho et al. (2018), and Wright and Harris (2020).

### **Family Detonidae**

*Armadilloniscus coronacapitalis* Menzies, 1950 [Fig. 43C] Littoral halophilic species, occurring under stones, driftwood, decaying eelgrass, or other debris along high tide line of marshes, bays, and estuaries; Marin County, northern California to San Miguel and Anacapa Islands, southern California, USA. Type locality: USA,

California, Marin County, Tomales Bay, Tomales Point. Body length to ~ 4.6 mm. See Menzies (1950c), Miller (1975), Taiti and Ferrara (1989), Garthwaite and Lawson (1992), Garthwaite et al. (1992), Leistikow and Wägele (1999), Jass and Klausmeier (2000, 2001), Schmalfuss (2003), McLaughlin et al. (2005), and Espinosa-Pérez and Hendrickx (2006).

*Armadilloniscus holmesi* Arcangeli, 1933 [Fig. 43D] Littoral halophilic species, occurring under stones, driftwood, decaying eelgrass, or other debris along high tide line of marshes, bays and estuaries, and in the spray zone on rocky beaches: British Columbia, Canada to Magdalena Bay, Baja California Sur, Mexico. Type locality: USA, California, San Diego County, San Diego. Body length to ~ 3.9 mm. See Arcangeli (1933), Menzies (1950c), Miller (1975), Taiti and Ferrara (1989), Garthwaite and Lawson (1992), Garthwaite et al. (1992), Leistikow and Wägele (1999), Jass and Klausmeier (2000, 2001), Schmalfuss (2003), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), Wright and Harris (2020), and SCAMIT (2021).

*Armadilloniscus lindahli* (Richardson, 1905) [Fig. 43E] Littoral halophilic species, occurring under stones, driftwood, decaying eelgrass, or other debris along high tide line of marshes, bays and estuaries, and in the spray zone on rocky beaches; Tomales Bay, northern California to San Diego, southern California, USA. Type locality: USA, California, Oakland. Body length to ~ 4.5 mm. See Richardson (1905a original description as *Actoniscus lindahli*), Menzies (1950c), Miller (1975), Taiti and Ferrara (1989), Garthwaite and Lawson (1992), Garthwaite et al. (1992), Leistikow and Wägele (1999), Jass and Klausmeier (2000, 2001), Schmalfuss (2003), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), and Wright and Harris (2020).

## Family Halophilosciidae

*Littorophiloscia richardsonae* (Holmes & Gay, 1909) [Fig. 42B] Littoral halophilic species common above the high tide line in marshes, bays and estuaries, and in the spray zone on rocky beaches; Vancouver Island, British Columbia, Canada to Cedros Island, Baja California Norte, Mexico. Type locality: USA, California, San Diego, on moist swampy ground. Body length to ~ 5 mm. See Holmes and Gay (1909 original description as *Philoscia richardsonae*), Hatch (1947), George and Strömborg (1968), Miller (1975), Taiti and Ferrara (1986), Garthwaite and Lawson (1992), Leistikow and Wägele (1999), Jass and Klausmeier (2000, 2001), Schmalfuss (2003), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), Brusca et al. (2007), Whitcraft et al. (2008), Roletto et al. (2014), Shaughnessy et al. (2017), and Wright and Harris (2020).

## Family Ligiidae

*Ligia* cf. *occidentalis* (Dana, 1853) [Fig. 42A, image of representative species *L. occidentalis*] Spray zone of high intertidal rocky shores; Refugio (south of Point Conception),

southern California, USA to Puerto San Carlos, Baja California Sur, Mexico. Type locality: not applicable, but near the Sacramento River, California, USA for *L. occidentalis* [overall range: Oregon, USA to Chamela Bay, Jalisco, Mexico, and Gulf of California]. Body length to ~ 25 mm (without uropods). See Dana (1853 original description as *Lygia occidentalis*), Richardson (1899, 1900c, 1905a), Hewatt (1946), Brusca (1966), Miller (1975), Allen (1976), Lee and Miller (1980), Ricketts et al. (1985), Garthwaite and Lawson (1992), Leistikow and Wägele (1999), Jass and Klausmeier (2000, 2001), Espinosa-Pérez and Hendrickx (2001a, 2002, 2006), Schmalfuss (2003), Brusca et al. (2004, 2007), McLaughlin et al. (2005), Campos and Villarreal (2008), Hurtado et al. (2010), Eberl (2012), SCAMIT (2012–2021), Eberl et al. (2013), Roletto et al. (2014), Santamaria et al. (2016), and Wright and Harris (2020). Note: References cited above cover *L. occidentalis* in general (including *L. cf. occidentalis* as recognized herein); see Endnote 30.

## Family Platyarthridae

*Niambia capensis* (Dollfus, 1895) [Fig. 42C] Supralittoral and riparian species, occurring on sandy beaches and the edges of marshes in beach wrack, holdfasts, and under driftwood, logs, and rocks; introduced species from Namibia and South Africa, occurring along Pacific coast of North America from southern Washington State to southern California, USA, and in continental Chile and on Saint Helena Island in the South Atlantic Ocean. Type locality: Africa, Namibia. Body length to ~ 5.4 mm. See Dollfus (1895 original description as *Metoponorthus capensis*), Miller (1936 as *Porcellio littorinus*), Leistikow and Wägele (1999), Jass and Klausmeier (2000, 2001), Schmalfuss (2003), McLaughlin et al. (2005), Espinosa-Pérez and Hendrickx (2006), Brusca et al. (2007), Maloney et al. (2008), Pérez-Schultheiss et al. (2018), and Pérez-Schultheiss and Urra (2020).

## Family Tylidae

*Tylos punctatus* Holmes & Gay, 1909 [Fig. 42D] Littoral halophilic species on sandy beaches, burrows in sand above the most recent high tide line during the day and is active on the surface at night (may co-occur with *Alloniscus perconvexus* in southern California); San Diego, California, USA to Ensenada, Baja California Norte, Mexico, and the Gulf of California. Type locality: USA, California, San Diego, in sand near the beach. Body length to ~ 10 mm. See Holmes and Gay (1909), Stafford (1913b), Hewatt (1946), Schultz (1970), Brusca (1980), Ricketts et al. (1985), Leistikow and Wägele (1999), Jass and Klausmeier (2000, 2001), Espinosa-Pérez and Hendrickx (2001a, 2006), Schmalfuss (2003), Brusca et al. (2004, 2007), McLaughlin et al. (2005), SCAMIT (2011–2021), Hubbard et al. (2014), and Wright and Harris (2020).

**Table 2.** Diversity of isopods by habitat type in the Southern California Bight. Data are expressed as the number of species per taxon occurring in each habitat. Intertidal habitats include outer coast rocky shores and sandy beaches, as well as soft and hard substrates along the edges of marshes, bays, and estuaries. Subtidal habitats include shallow bays and estuaries, plus shallow to deep waters of the continental shelf, slope, basins, and submarine canyons.

Taxon	Intertidal	Bays & estuaries	Shelf, slope, basins, canyons		
			< 200 m	200–1000 m	> 1000 m
<b>Suborder Cymothoidea</b>	<b>20</b>	7	47	19	8
Superfamily Anthuroidea	4	2	10	2	1
Superfamily Cymothooidea	8	1	24	14	5
Infraorder Epicaridea					
Superfamily Bopyroidea	7	4	11	1	1
Superfamily Cryptoniscoidea	1	–	2	2	1
<b>Suborder Limnorioidea</b>	<b>3</b>	–	<b>1</b>	–	–
<b>Suborder Sphaeromatidea</b>	<b>22</b>	<b>4</b>	<b>16</b>	–	–
Superfamily Seroloidea	1	1	1	–	–
Superfamily Sphaeromatoidea	21	3	15	–	–
<b>Suborder Valvifera</b>	<b>18</b>	<b>1</b>	<b>22</b>	<b>1</b>	<b>2</b>
<b>Suborder Asellota</b>	<b>17</b>	<b>1</b>	<b>33</b>	<b>18</b>	<b>5</b>
Superfamily Janiroidea	17	1	32	18	5
Superfamily Stenetroidea	–	–	1	–	–
<b>Suborder Oniscoidea</b>	<b>9</b>	–	–	–	–
<b>Total No. Species</b>	<b>89</b>	<b>13</b>	<b>119</b>	<b>38</b>	<b>15</b>

## Discussion

The marine habitats of the Southern California Bight (SCB) are characterized by a diverse isopod fauna with species occurring from the upper intertidal of rocky shores and sandy beaches, to the shallow waters of local bays and estuaries, and in the deeper offshore benthos of the continental shelf, slope, basins, and submarine canyons (Table 2). The offshore shelf, composed of soft and hard bottom substrates at depths to ~ 200 m, houses the greatest diversity of SCB isopods (119 species), while the various intertidal habitats have the second highest diversity (89 species). Fewer species have been reported from the shallow subtidal waters of SCB bays and estuaries (13 species) as well as deeper waters of the continental slope to ~ 1000 m (38 species) and below (15 species). However, this pattern may be due in part to less intensive sampling that has been conducted in the deeper areas compared to the shelf and intertidal habitats.

Overall, 190 species of isopods are recognized in this review as likely to occur in the SCB. However, seven of these species represent provisional taxa confirmed from just a few sites located ~ 30–90 km north of the SCB northern boundary (i.e., between Point Conception and San Luis Obispo) that were sampled during the benthic survey of the Santa Maria Basin and Western Santa Barbara Channel in the 1980s (see Wetzer and Brusca 1997; Wetzer et al. 1997; Wilson 1997). These species include the anthuroid *Kupellonura* sp. A, and the asellotes *Desmosoma* sp. A, *Janiralata* sp. C, *Janiralata* sp. D, *Joeropsis* sp. A, *Prochelator* sp. A, and *Stenetrium* sp. A that occurred at depths between ~ 50–300 m. Of these species, *Prochelator* sp. A has also been reported from much deeper waters (2955 m) located further north in the Gulf of the Farallones

off San Francisco, northern California (Blake et al. 2009). It seems reasonable to expect that each of the above seven species may also range at least a little further south into northern SCB waters and therefore be encountered in future surveys of the region.

Approximately 22% of the isopods treated herein (41 species) appear restricted to SCB waters at this time. However, fewer than half of these isopods have been formally described, while the remainder represent distinct provisional species of which many are known from only one or a few samples. Thus, it seems likely that some or all these provisional species may have broader geographic distributions than summarized in this review. In contrast, most of the species covered in this paper (~ 76%) have broader eastern Pacific distributions. For example, 111 of the species covered (~ 58%) also occur north of the SCB ranging variously along the coasts of central and northern California to Oregon, Washington, British Columbia, Alaska, and into the Bering Sea. Additionally, 73 species (~ 38%) also range south of the SCB in the eastern Pacific, occurring along the southwestern coast of Baja California, throughout the Gulf of California, and off the western coasts of Mexico, Central and South America, and the Galapagos Islands.

Twenty-seven of the SCB isopod species also occur in other areas of the world beyond the eastern Pacific, some of which have been introduced to new regions or distributed globally by international shipping. These wide-ranging species include one paranthurid (*Paranthura japonica*), two aegids (*Aegiochus plebeia* and *Rocinela signata*), one cirolanid (*Excirolana chiltoni*), two cymothoids (*Ceratothoa gaudichaudii* and *Renocila thresherorum*), six epicarideans (*Aporobopyrus oviformis*, *Argeia pugettensis*, *Bathygyge grandis*, *Orthione griffenis*, *Ione cornuta*, and *Hemioniscus balani*), two limnoriids (*Limnoria quadripunctata* and *L. tripunctata*), five sphaeromatids (*Paracerceis sculpta*, *Paradella diana*, *Pseudosphaeroma* sp., *Sphaeroma quoianum*, and *S. walkeri*), one idoteid (*Synidotea harfordi*), five asellotes (*Caecijaera horvathi*, *Iais californica*, *Ianiropsis derjugini*, *Ianiropsis tridens*, and *Munna stephensi*), and one oniscid (*Niambia capensis*). Also occasionally occurring in SCB waters during warm water years is the cosmopolitan pelagic species *Idotea metallica*. See the annotated species list provided in this review for additional details and references regarding each of the above species.

Some species may have been introduced multiple times, and others have become established residents in their new localities with expanding ranges. For example, based on mitochondrial data, the sphaeromatid *Pseudosphaeroma* sp. appears to have been introduced multiple times from the southern hemisphere (RW, pers. obs.). In Morro Bay located just north of the SCB, *Pseudosphaeroma* sp. is now known to be associated with dead barnacle tests found attached to dock pilings. Additionally, the species is known to co-occur with the sacoglossan sea slug *Alderia* sp. in San Francisco Bay on high intertidal mudflats, tolerating freshwater immersion following rain events. Most recently in 2018, a single specimen identified as *Pseudosphaeroma* sp. was collected in the Salinas de San Pedro (Los Angeles County), thus extending the range of this introduced species to the SCB (RW, pers. obs.; specimen in Natural History Museum of Los Angeles County collections, Catalog No. LACM:DISCO:9917).

Another sphaeromatid, *Paracerceis sculpta*, best known for its multiple male morphs (designated alpha, beta, and gamma) in the northern Gulf of California (Shuster 1987, 1992), is expanding its range not only in SCB bays and harbors, but also on rocky outer

coast habitats. In its newly adopted habitats, *P. sculpta* readily occurs on non-native bryozoans, algae, and assorted fouling organisms. Although originally described from pieces of a sponge dredged from shallow water off San Clemente Island in the SCB, *P. sculpta* is now widely distributed in coastal waters around the globe (Marchini et al. 2018). On the other hand, it is possible that *P. sculpta* as currently recognized represents more than one species. For example, the smaller beta and gamma males are known to co-occur with the larger alpha males only in northern Gulf of California populations, while populations outside of the Gulf include only alpha males. Unfortunately, there are no genetic barcode sequences available for northern Gulf of California specimens (RW and S Shuster, pers. comm.). In contrast, genetic sequences for *P. sculpta* occurring in the central and southern Gulf of California are similar to those from specimens collected in San Diego bays and harbors and northwards where beta and gamma males have never been noted. In other words, it is not out of the question that specimens from the northern Gulf of California are an unnamed *Paracerceis* species, and that the species name *P. sculpta* has been attributed incorrectly to isopods from that region. In fact, taxa attributed to broad geographic ranges are likely to be found to be different species upon closer examination unless it is a species with a propensity to be readily relocated by anthropogenic means. Another sphaeromatid example of such a pattern is the “*Exosphaeroma amplicauda*” clade referred to previously in this review (see Endnote 18), which in the past was reported as a single species ranging from the Aleutian Islands to northern Baja California. However, Wall et al. (2015) demonstrated that between Alaska and southern California there are at least five species comprising this group, and perhaps more, as these authors did not consider specimens from the Channel Islands where additional species are likely to occur. Because of such uncertainties, we acknowledge that unknown numbers of undescribed taxa are likely to become evident in the future as morphological taxonomic revisions are undertaken and new genetic data are added.

We also recognize the shortcomings of reproducing dorsal view line drawings for most species yet are grateful to previous authors for their efforts. Although dorsal views have long been the accepted standard depiction for isopods, such views are often not especially useful for identifying some species. For example, identification of some asellotes and arcturid valviferans would greatly benefit from lateral views. Ventral views depicting the pleotelson features of valviferans and sphaeromatids would also improve and simplify many identifications. However, such views do not exist for most taxa. High quality color photographs of live specimens would also be a vast improvement in facilitating accurate species identifications. Fortunately, with the increasing popularity of community platforms such as iNaturalist, in-situ color photographs of live animals are helping to expand our knowledge of species distributions, as well as contributing new and valuable habitat information. As videos of living specimens become more common, insights into the behavior and habitat use of species should also improve.

Several other active projects are also moving forward that should further our understanding of the biodiversity and taxonomy of many groups. For example, the National Science Foundation’s digitization efforts of natural history museum collections, such as the current 4-year effort underway at the Natural History Museum of Los Angeles

County in southern California (DigIn: <https://www.digin-tcn.org>), involving 19 US collections, are making biological specimens that have been silently sitting on basement shelves for the past hundred years available on the web. Some collections such as the National Museum of Natural History (Smithsonian Institution) already have most of their collections digitized. Similarly, many collections in Europe, Australia, and New Zealand have all or most of their collections publicly available or are similarly working on capturing specimen metadata and publishing it. Consequently, these data are now becoming publicly available through existing portals, including the Integrated Digitized Biocollections (iDigBio.org) and Global Biodiversity Information Facility (GBIF), using standardized data formats. Genetic sequence data are also accumulating in the NIH genetic sequence database (GenBank) and the Barcode of Life Data Systems (BOLD). Electronic specimen data portals, such as InvertEBase <https://invertebase.org/portal/> (based on Symbiota, open-source software for managing and mobilizing biodiversity data), are supporting a growing network of natural history collections, but will need continuing refinements in order to support regional needs and improve user accessibility and applicability. The Biodiversity Heritage Library (BHL) has made enormous amounts of previously inaccessible primary taxonomic literature readily available. Together these resources are game changers for accessibility to worldwide marine biodiversity data and our understanding of the changing marine environment around us.

The next step, just now beginning, is to knit the systems above (and others like them) into an integrated architecture of biodiversity knowledge. The goal is to realize the ideals expressed in the emerging “Extended Specimen” concept (see Hedrick et al. 2020; Lendemer et al. 2020; Miller et al. 2020; NASEM 2020; Heberling et al. 2021; Hardisty et al. 2022). In this view, specimens (e.g., type specimens) stand at the center of an interlinked cloud of digitally accessible information, enabling taxonomic understanding of biodiversity by combining local and non-local specimen-based data (Rocha et al. 2014; Meyer et al. 2021). Therefore, we hope that future versions of this guide to the SCB marine isopod fauna will function as a direct entry point to all available specimen-based data and taxonomic research relevant to the region’s taxonomy and biogeography.

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## References

Abdelsalam K, Ramadan S (2019) First record of the wood borer *Limnoria tripunctata* Menzies 1951, in the Egyptian Mediterranean Sea. *Rapports et procés-verbaux des réunions Commission internationale pour l'exploration scientifique de la Mer Méditerranée* 42: 178.

Abelló P, Guerao G, Codina M (2004) Distribution of the neustonic isopod *Idotea metallica* in relation to shelf-slope frontal structures. *Journal of Crustacean Biology* 24(4): 558–566. <https://doi.org/10.1651/C-2505>

Aguilar-Perera A (2022) Checklist of parasitic isopods (Crustacea: Isopoda) infesting marine decapod and fishes off Mexico's coasts. *Thalassas: An International Journal of Marine Sciences* 38(1): 113–121. <https://doi.org/10.1007/s41208-021-00336-x>

Aguilar-Perera A, Noh-Quiñones V (2022) Prevalence of *Rocinela signata* Schioedte & Meinert, 1879 (Crustacea: Isopoda: Aegidae) in hogfish *Lachnolaimus maximus* (Walbaum, 1792) (Teleostei: Labridae). *Thalassas: An International Journal of Marine Sciences* 38(2): 1195–1198. <https://doi.org/10.1007/s41208-022-00459-9>

Aguilar-Perera A, Valle-Nava J, Williams EH, Bunkley-Williams L (2018) *Rocinela signata* (Isopoda: Aegidae) parasitizing Indo-Pacific lionfish *Pterois volitans* (Scorpaeniformes: Scorpaenidae) in the Southern Gulf of Mexico. *Marine Biology Research* 14(8): 883–886. <https://doi.org/10.1080/17451000.2018.1528012>

Ahyong ST, Lowry JK, Alonso M, Bamber RN, Boxshall GA, Castro P, Gerken S, Karaman GS, Goy JW, Jones DS, Meland K, Rogers DC, Svavarsson J (2011) Subphylum Crustacea Brünnich, 1772. In: Zhang Z-Q (Ed.) *Animal biodiversity: An outline of higher-level classification and survey of taxonomic richness*. *Zootaxa* 3148(1): 165–191. <https://doi.org/10.11646/zootaxa.3148.1.33>

Ali NG, Aboyadak IM (2018) Histopathological alterations and condition factor deterioration accompanied by isopod infestation in *Tilapia zilli*, *Mugil capito* and *Solea aegyptiaca* from Lake Qaroun. *Egyptian Journal of Aquatic Research* 44(1): 57–63. <https://doi.org/10.1016/j.ejar.2018.03.001>

Allen RK (1976) *Common Intertidal Invertebrates of Southern California*. Revised Edition. Peek Publications, Palo Alto, 316 pp.

Allen MJ, Moore SL, Schiff KC, Weisberg SB, Diener D, Stull JK, Groce A, Mubarak J, Tang CL, Gartman R (1998) Southern California Bight 1994 Pilot Project: Vol. V. Demersal Fishes and Megabenthic Invertebrates. Technical Report 308. Southern California Coastal Water Research Project, Westminster, 146 pp. [+ Literature Cited + appendices] <https://www.sccwrp.org/publications>

Allen MJ, Groce AK, Diener D, Brown J, Steinert SA, Deets G, Noblet JA, Moore SL, Diehl D, Jarvis ET, Raco-Rands V, Thomas C, Ralph Y, Gartman R, Cadien D, Weisberg SB, Mikel T (2002) Southern California Bight 1998 Regional Monitoring Program: Vol. V. Demersal Fishes and Megabenthic Invertebrates. Technical Report 380. Southern California Coastal Water Research Project, Westminster, 572 pp. <https://www.sccwrp.org/publications>

Allen MJ, Mikel TK, Cadien DB, Kalman JE, Jarvis ET, Schiff KC, Diehl DW, Moore SL, Walther S, Deets G, Cash C, Watts S, Pondella DJ II, Raco-Rands V, Thomas C, Gartman R, Sabin L, Power W, Groce AK, Armstrong JL (2007) Southern California Bight 2003 Regional Monitoring Program: Vol. IV. Demersal Fishes and Megabenthic Invertebrates. Technical Report 505. Southern California Coastal Water Research Project, Costa Mesa, 338 pp. [+ appendices] <https://www.sccwrp.org/publications>

Allen MJ, Cadien DB, Miller E, Diehl DW, Ritter K, Moore SL, Cash C, Pondella DJ, Raco-Rands V, Thomas C, Gartman R, Power W, Latker AK, Williams J, Armstrong JL, Schiff K (2011) Southern California Bight 2008 Regional Monitoring Program: Vol. IV. Demersal Fishes and Megabenthic Invertebrates. Technical Report 655. Southern California Coastal Water Research Project, Costa Mesa, 127 pp. [+ appendices] <https://www.sccwrp.org/publications>

Alves AM, Leonardo MG, Souza GTR, Takemoto RM, de Lima FS, Tavares LER, Melo CM, Madi RR, Jeraldo VLS (2019) Occurrence of isopods in two species of snappers (Lutjanidae) from Northeast Brazil. *Journal of Parasitology Research* 2019(8176283): 1–8. <https://doi.org/10.1155/2019/8176283>

An J, Williams JD, Yu H (2009) The Bopyridae (Crustacea: Isopoda) parasitic on thalassinid-eans (Crustacea: Decapoda) from China. *Proceedings of the Biological Society of Washington* 122(2): 225–246. <https://doi.org/10.2988/08-26.1>

An J, Boyko CB, Li X (2015) A review of bopyrids (Crustacea: Isopoda: Bopyridae) parasitic on caridean shrimps (Crustacea: Decapoda: Caridea) from China. *Bulletin of the American Museum of Natural History* 399: 1–85. <https://doi.org/10.1206/amnb-921-00-01.1>

Aneesh PT, Bruce NL, Nashad M, Bineesh K, Mohamed Hatha AA (2020) A new species of *Renocila* Miers, 1880 (Crustacea: Isopoda: Cymothoidae), a fish parasitic isopod from Andaman Island, India. *Marine Biology Research* 16(5): 396–410. <https://doi.org/10.1080/17451000.2020.1761028>

Aneesh PT, Nashad M, Bijukumar A, Bineesh K, Mohamed Hatha AA (2021) Review of the global distribution and hosts of the fish parasitic isopod genus *Renocila* Miers, 1880 (Crustacea: Cymothoidae) with the description of a new species from Andaman Islands, India. *Journal of Natural History* 55(43–44): 2761–2785. <https://doi.org/10.1080/00222933.2021.2019341>

Annisaqois M, Wägele JW (2021) Morphology and taxonomy of Isopoda Anthuroidea (Crustacea) from Sulawesi with description of six new species. *European Journal of Taxonomy* 768: 1–52. <https://doi.org/10.5852/ejt.2021.768.1501>

Arcangeli A (1933) Isopodi terrestri delle isole Samoa e considerazioni sopra la distribuzione geographica del genere *Armadillo* Latr. emend. *Verh. Bollettino dei Musei di Zoologia ed Anatomia comparata della R. Università di Torino* 43: 25–33.

Ariyama H, Otani M (2004) *Paracerceis sculpta* (Crustacea: Isopoda: Sphaeromatidae), a newly introduced species into Osaka Bay, central Japan. *Benthos Research* 59(2): 53–59. [https://doi.org/10.5179/benthos1996.59.2\\_53](https://doi.org/10.5179/benthos1996.59.2_53)

Artüz ML, Kubanç C (2015) Two new species of *Stenosoma* (Isopoda, Idoteidae) from the Sea of Marmara. *Crustaceana* 88(10–11): 1201–1220. <https://doi.org/10.1163/15685403-00003481>

Azofeifa-Solano JC, Cortés J (2020) Chapter 24. Diversity and biology of deep-water crustaceans in Costa Rica. In: Hendrickx ME (Ed.) *Deep-Sea Pycnogonids and Crustaceans of the Americas*, Springer, 633–658. [https://doi.org/10.1007/978-3-030-58410-8\\_24](https://doi.org/10.1007/978-3-030-58410-8_24)

Barnard KH (1914) Contributions to the crustacean fauna of South Africa. 3. Additions to the marine Isopoda, with notes on some previously incompletely known species. *Annals of the South African Museum* 10(11): 325a–358a, 359–440. <https://doi.org/10.5962/bhl.part.9319>

Bastida R, Torti MR (1972) Organismos perforantes de las costas argentinas. II. La presencia de *Limnoria tripunctata* Menzies, 1951 (Isopoda, Limnoriidae) en el puerto de Mar del Plata. *Physis* 31(82): 143–153.

Bastida-Zavala JR, García-Madrigal MS, Rosas-Alquicira EF, López-Pérez RA, Benítez-Villalobos F, Meraz-Hernando JF, Torres-Huerta AM, Montoya-Márquez A, Barrientos-Luján NA (2013) Marine and coastal biodiversity of Oaxaca, Mexico. *Check List* 9(2): 329–390. <https://doi.org/10.15560/9.2.329> [with erratum]

Bate CS (1863) On a new species of *Ione*. *Report of the Thirty-Third Meeting of the British Association for the Advancement of Science* 33: 98.

Benedict JE (1897) A revision of the genus *Synidotea*. *Proceedings of the Academy of Sciences of Philadelphia* 1897: 387–404.

Benedict JE (1898) Two new isopods of the genus *Idotea* from the coast of California. *Proceedings of the Biological Society of Washington* 12: 53–55.

Bergen M, Weisberg SB, Cadien D, Dalkey A, Montagne D, Smith RW, Stull JK, Velarde RG (1998) Southern California Bight 1994 Pilot Project: IV. Benthic Infauna. Southern California Coastal Water Research Project, Westminster, 260 pp. <https://www.sccwrp.org/publications>

Bergen M, Weisberg SB, Smith RW, Cadien DB, Dalkey A, Montagne DE, Stull JK, Velarde RG, Ranasinghe JA (2001) Relationship between depth, sediment, latitude, and the structure of benthic infaunal assemblages on the mainland shelf of southern California. *Marine Biology* 138(3): 637–647. <https://doi.org/10.1007/s002270000469>

Bernardino AF, Smith CR, Baco A, Altamira I, Sumida PYG (2010) Macrofaunal succession in sediments around kelp and wood falls in the deep NE Pacific and community overlap with other reducing habitats. *Deep-Sea Research I* 57(5): 708–723. <https://doi.org/10.1016/j.dsr.2010.03.004>

Birstein YA (1973) Deep water isopods (Crustacea. Isopoda) of the north-western part of the Pacific Ocean. Translated from Russian. Published for the Smithsonian Institution and the National Science Foundation, Washington, D.C. by the Indian National Scientific Documentation Centre, New Delhi. 316 pp.

Blake JA, Maciolek NJ, Ota A, Williams IP (2009) Long-term benthic infaunal monitoring at a deep-ocean dredged material disposal site off Northern California. *Deep-sea Research. Part II, Topical Studies in Oceanography* 56(19–20): 1775–1803. <https://doi.org/10.1016/j.dsr2.2009.05.021>

Boone PL (1918) Description of ten new isopods. *Proceedings of the United States National Museum* 54(2253): 591–604. <https://doi.org/10.5479/si.00963801.54-2253.591>

Boone PL (1923) New tanaid and isopod Crustacea from California. *Proceedings of the Biological Society of Washington* 36: 147–156.

Borges LMS, Costa FO (2014) New records of marine wood borers (Bivalvia: Teredinidae and Isopoda: Limnoriidae) from São Miguel, Azores, with a discussion of some aspects of their biogeography. *Acoreana* (Supplement 10): 109–116.

Borges LMS, Merckelbach LM, Cragg SM (2014) Biogeography of wood-boring crustaceans (Isopoda: Limnoriidae) established in European coastal waters. *PLoS ONE* 9(10): e109593. <https://doi.org/10.1371/journal.pone.0109593>

Bosc LAG (1801) *Histoire naturelle des Crustacés contenant leur description et leurs moeurs; avec figures dessinées, d'après nature*. Deterville, Paris 2: 1–296 [pls. 6–18]. <https://doi.org/10.5962/bhl.title.59168>

Bowman TE (1977) Isopod crustaceans (except Anthuridae) collected on the Presidential Cruise of 1938. *Proceedings of the Biological Society of Washington* 89(57): 653–666.

Bowman TE, Schultz GA (1974) The isopod crustacean genus *Munnogonium* George and Strömberg, 1968 (Munnidae, Asellota). *Proceedings of the Biological Society of Washington* 87(25): 265–272. <https://www.biodiversitylibrary.org/page/34672960#page/293>

Boyko CB (2003) New host and distribution records for *Leidya bimini* Pearse, 1951 in the Gulf of Mexico, with comments on related taxa and a redescription of *Cardiocepon pteroides* Nobili, 1906 (Crustacea: Isopoda: Bopyridae: Ioninae). *Gulf and Caribbean Research* 15(1): 5–11. <https://doi.org/10.18785/gcr.1501.02>

Boyko CB, Williams JD (2003) A revision of *Anathelges* and *Stegophryxus* (Isopoda: Bopyridae: Athelginae) with descriptions of two new genera and one new species. *Journal of Crustacean Biology* 23(4): 795–813. <https://doi.org/10.1651/C-2398>

Boyko CB, Williams JD (2004) New records of marine isopods (Crustacea: Peracarida) from the Bahamas, with descriptions of two new species of epicarideans. *Bulletin of Marine Science* 74(2): 353–383.

Boyko CB, Williams JD (2021a) A review of the genus *Zonophryxus* Richardson, 1903 (Crustacea: Isopoda: Dajidae) with recognition of *Colypurus agassizi* Richardson, 1905 (Crustacea: Isopoda: Colypuridae) as a synonym of *Zonophryxus similis* Searle, 1914 and the requisite sinking of Colypuridae. *Proceedings of the Biological Society of Washington* 134(1): 243–264. <https://doi.org/10.2988/0006-324X-134.1.243>

Boyko CB, Williams JD (2021b) New records of species of *Holophryxus* Richardson, 1905 (Crustacea: Isopoda: Dajidae) from the Atlantic and Pacific Oceans with comments on taxonomic issues in the genus. *Bulletin of the Peabody Museum of Natural History* 62(2): 111–121. <https://doi.org/10.3374/014.062.0203>

Boyko CB, Bruce NL, Hadfield KA, Merrin KL, Ota Y, Poore GCB, Taiti S (Eds) (2008 onwards) World Marine, Freshwater and Terrestrial Isopod Crustaceans database. <https://www.marinespecies.org/isopoda> [Accessed on 03 Mar 2023]

Boyko CB, Moss J, Williams JD, Shields JD (2013) A molecular phylogeny of Bopyroidea and Cryptoniscoidea (Crustacea: Isopoda). *Systematics and Biodiversity* 11(4): 495–506. <https://doi.org/10.1080/14772000.2013.865679>

Boyko CB, Williams JD, Shields JD (2017) Parasites (Isopoda: Epicaridea and Nematoda) from ghost and mud shrimp (Decapoda: Axiidea and Gebiidea) with descriptions of a new genus and a new species of bopyrid isopod and clarification of *Pseudione* Kossmann, 1881. *Zootaxa* 4365(3): 251–301. <https://doi.org/10.11646/zootaxa.4365.3.1>

Brandt JF (1851) Krebse. In: von Middendorff AT (Ed.) *Reise in den äussersten Norden und Osten Sibiriens während der Jahre 1843 und 1844 mit allerhöchster Genehmigung auf Veranstaltung der Kaiserlichen Akademie der Wissenschaften zu St. Petersburg ausgeführt und in Verbindung mit vielen Gelehrten herausgegeben* 2(Part 1): 77–148 [plates 5–6]. <https://doi.org/10.5962/bhl.title.53712>

Brandt A (1988) Antarctic Serolidae and Cirolanidae (Crustacea: Isopoda). In: Fricke R (Ed.) *Theses Zoologicae*, Vol. 10. Koeltz Scientific Books, Koenigstein, 143 pp.

Brandt A (1990) Antarctic Valviferans (Crustacea, Isopoda, Valvifera): New Genera, New Species and Redescriptions. E.J. Brill, Leiden, The Netherlands and New York, 176 pp.

Brandt A, Poore GCB (2001) Two new species of *Tridentella* (Crustacea: Isopoda: Tridentellidae) from Namibia. *Beaufortia* 51(11): 199–212.

Brandt A, Poore GCB (2003) Higher classification of the flabelliferan and related Isopoda based on a reappraisal of relationships. *Invertebrate Systematics* 17(6): 893–923. <https://doi.org/10.1071/IS02032>

Brix S, Held C, Kaiser S, Jennings RM, Driskell A, Brandt A (2021) Evolution and phylogeny of the deep-sea isopod families Desmosomatidae Sars, 1897 and Nannoniscidae Hansen, 1916 (Isopoda: Asellota). *Organisms, Diversity & Evolution* 21(4): 691–717. <https://doi.org/10.1007/s13127-021-00509-9>

Brown ME, Keller JK, Whitcraft CR (2022) Relationship of *Sphaeroma quoianum* to sediment characteristics and invertebrate community. *Biological Invasions* 24(11): 3631–3645. <https://doi.org/10.1007/s10530-022-02867-7>

Bruce NL (1981) Cirolanidae (Crustacea: Isopoda) of Australia: diagnoses of *Cirolana* Leach, *Metacirolana* Nierstrasz, *Neocirolana* Hale, *Anopsilana* Paulian & Debouteville, and three new genera – *Natatolana*, *Politolana* and *Cartetolana*. *Marine and Freshwater Research* 32(6): 945–966. <https://doi.org/10.1071/MF9810945>

Bruce NL (1984) A new family for the isopod crustacean genus *Tridentella* Richardson, 1905, with description of a new species from Fiji. *Zoological Journal of the Linnean Society* 80(4): 447–455. <https://doi.org/10.1111/j.1096-3642.1984.tb02555.x>

Bruce NL (1986a) Cirolanidae (Crustacea: Isopoda) of Australia. *Records of the Australian Museum* (Supplement 6): 1–239. <https://doi.org/10.3853/j.0812-7387.6.1986.98>

Bruce NL (1986b) Revision of the isopod crustacean genus *Mothocya* Costa, in Hope, 1851 (Cymothoidae: Flabellifera), parasitic on marine fishes. *Journal of Natural History* 20(5): 1089–1192. <https://doi.org/10.1080/00222938600770781>

Bruce NL (1990) The genera *Catoessa*, *Elthusa*, *Enipsa*, *Ichthyoxenus*, *Idusa*, *Livoneca*, and *Norileca* n. gen. (Isopoda, Cymothoidae), crustacean parasites of marine fishes, with descriptions of eastern Australian species. *Records of the Australian Museum* 42(3): 247–300. <https://doi.org/10.3853/j.0067-1975.42.1990.118>

Bruce NL (1993) Two new genera of marine isopod crustaceans (Flabellifera: Sphaeromatidae) from southern Australia, with a reappraisal of the Sphaeromatidae. *Invertebrate Taxonomy* 7(1): 151–171. <https://doi.org/10.1071/IT9930151>

Bruce NL (1995) The taxonomy and phylogeny of tube-tailed sphaeromatid isopods (Crustacea) with descriptions of new species and a new genus from southern Australia. *Ophelia* 43(2): 127–180. <https://doi.org/10.1080/00785326.1995.10429829>

Bruce NL (2003) New genera and species of sphaeromatid isopod crustaceans from Australian marine coastal waters. *Memoirs of the Museum of Victoria* 60(2): 309–369. <https://doi.org/10.24199/j.mmv.2003.60.28>

Bruce NL (2009a) The Marine Fauna of New Zealand: Isopoda, Aegidae (Crustacea). National Institute of Water and Atmospheric Research Ltd. (NIWA), Wellington. NIWA Biodiversity Memoir 122: 252.

Bruce NL (2009b) New genera and species of the marine isopod family Serolidae (Crustacea, Sphaeromatidea) from the southwestern Pacific. *ZooKeys* 18: 17–76. <https://doi.org/10.3897/zookeys.18.96>

Bruce NL, Bowman TE (1982) The status of *Cirolana parva* Hansen, 1890 (Crustacea, Isopoda, Cirolanidae) with notes on its distribution. *Proceedings of the Biological Society of Washington* 95(2): 325–333.

Bruce NL, Jones DA (1981) The systematics and ecology of some cirolanid isopods from southern Japan. *Journal of Natural History* 15(1): 67–85. <https://doi.org/10.1080/00222938100770061>

Bruce NL, Wetzer R (2004) *Paradella tiffany* sp. nov., a distinctive sphaeromatid isopod (Crustacea: Isopoda: Sphaeromatidea) from Baja California, Mexico. *Zootaxa* 623(1): 1–12. <https://doi.org/10.11646/zootaxa.623.1.1>

Bruce NL, Wetzer R (2008) New Zealand exports: *Pseudosphaeroma* Chilton, 1909 (Isopoda: Sphaeromatidae), a southern hemisphere genus introduced to the Pacific coast of North America. *Zootaxa* 1908(1): 51–56. <https://doi.org/10.11646/zootaxa.1908.1.4>

Brusca GJ (1966) Studies on the salinity and humidity tolerances of five species of isopods in a transition from marine to terrestrial life. *Bulletin of the Southern California Academy of Sciences* 65(3): 146–154.

Brusca RC (1977) Range extensions and new host records of cymothoid isopods (Isopoda: Cymothoidae) in the Eastern Pacific Ocean. *Bulletin of the Southern California Academy of Sciences* 76(2): 128–131.

Brusca RC (1978a) Studies on the cymothoid fish symbionts of the eastern Pacific (Isopoda, Cymothoidae) I. Biology of *Nerocila californica*. Crustaceana 34(2): 141–154. <https://doi.org/10.1163/156854078X00718>

Brusca RC (1978b) Studies on the cymothoid fish symbionts of the eastern Pacific (Crustacea: Cymothoidae) II. Systematics and biology of *Lironeca vulgaris* Stimpson 1857. Occasional Papers of the Allan Hancock Foundation (n. ser.)2: 1–19.

Brusca RC (1980) Common Intertidal Invertebrates of the Gulf of California, 2<sup>nd</sup> edn. University of Arizona Press, Tucson, 513 pp.

Brusca RC (1981) A monograph on the Isopoda Cymothoidae (Crustacea) of the eastern Pacific. Zoological Journal of the Linnean Society 73(2): 117–199. <https://doi.org/10.1111/j.1096-3642.1981.tb01592.x>

Brusca RC (1983a) A monograph on the isopod family Aegidae in the tropical eastern Pacific I. The genus *Aega*. Allan Hancock Monographs in Marine Biology 12: 1–39.

Brusca RC (1983b) Two new isopods from Baja California and the Gulf of California (Mexico) and an analysis of the evolutionary history of the genus *Colidotea* (Crustacea: Isopoda: Idoteidae). Transactions of the San Diego Society of Natural History 20(4): 69–79. <https://doi.org/10.5962/bhl.part.28998>

Brusca RC (1984) Phylogeny, evolution and biogeography of the marine isopod subfamily Idoteinae (Crustacea: Isopoda: Idoteidae). Transactions of the San Diego Society of Natural History 20(7): 99–134. <https://doi.org/10.5962/bhl.part.29001>

Brusca GJ, Brusca RC (1978) A Naturalist's Seashore Guide. Common Marine Life of the Northern California Coast and Adjacent Shores. Mad River Press, Eureka, 205 pp.

Brusca RC, France SC (1992) The genus *Rocinela* (Crustacea: Isopoda: Aegidae) in the tropical eastern Pacific. Zoological Journal of the Linnean Society 106(3): 231–275. <https://doi.org/10.1111/j.1096-3642.1992.tb01248.x>

Brusca RC, Iverson EW (1985) A Guide to the Marine Isopod Crustacea of Pacific Costa Rica. Revista de Biología Tropical 33: 1–77.

Brusca RC, Ninos M (1978) The status of *Cirolana californiensis* Schultz, and *C. diminuta* Menzies and George, with a key to the California species of *Cirolana* (Isopoda: Cirolanidae). Proceedings of the Biological Society of Washington 91(2): 379–385.

Brusca RC, Wallerstein BR (1977) The marine isopod Crustacea of the Gulf of California. I. Family Idoteidae. American Museum Novitates 2634: 1–17. <http://hdl.handle.net/2246/2949>

Brusca RC, Wallerstein BR (1979a) The marine isopod crustaceans of the Gulf of California II. Idoteidae: New genus and species, range extensions, and comments on evolution and taxonomy within the family. Proceedings of the Biological Society of Washington 92(2): 253–271.

Brusca RC, Wallerstein BR (1979b) Zoogeographic patterns of idoteid isopods in the northeast Pacific, with a review of shallow water zoogeography of the area. Bulletin of the Biological Society of Washington 3: 67–105.

Brusca RC, Wallerstein BR (1982) Fish predation: a preliminary study of its role in the zoogeography and evolution of shallow water idoteid isopods (Crustacea: Isopoda: Idoteidae). Journal of Biogeography 9(2): 135–150. <https://doi.org/10.2307/2844698>

Brusca RC, Wilson GDF (1991) A phylogenetic analysis of the Isopoda with some classificatory recommendations. Memoirs of the Queensland Museum 31: 143–204.

Brusca RC, Wetzer R, France SC (1995) Cirolanidae (Crustacea: Isopoda: Flabellifera) of the tropical eastern Pacific. *Proceedings of the San Diego Natural History Museum* 30: 1–96.

Brusca RC, Kimrey E, Moore W [Eds] (2004) *A Seashore Guide to the Northern Gulf of California*. Arizona-Sonora Desert Museum, Tucson, 203 pp.

Brusca RC, Coelho VR, Taiti S (2007) Isopoda. In: Carlton JT (Ed.) *The Light and Smith Manual: Intertidal Invertebrates from Central California to Oregon*. 4<sup>th</sup> edn., University of California Press, Berkeley, 503–542.

Buchholz R (1866) Ueber *Hemioniscus*, eine neue Gattung parasitischer Isopoden. *Zeitschrift für Wissenschaftliche Zoologie* 16(3): 303–327.

Bueno LS, Souza TF, Leite JR, Hostim-Silva M, Olier BS, Sanches EG (2022) First record of parasitic isopods *Nerocila acuminata* (Schiödte & Meinert, 1881) and *Nerocila armata* (Dana, 1853) (Artropoda, Cymothoidae) in Goliath grouper *Epinephelus itajara* (Lichtenstein, 1822) in southern Atlantic Ocean. *Brazilian Journal of Biology* 82(e237668): 1–2. <https://doi.org/10.1590/1519-6984.237668>

Bugnot AB, Coleman RA, Figueira WF, Marzinelli EM (2015) Community-level impacts of the invasive isopod *Cirolana harfordi*. *Biological Invasions* 17(4): 1149–1161. <https://doi.org/10.1007/s10530-014-0785-z>

Bunkley-Williams L, Williams Jr EH, Bashirullah AKM (2006) Isopods (Isopoda: Aegidae, Cymothoidae, Gnathiidae) associated with Venezuelan marine fishes (Elasmobranchii, Actinopterygii). *Revista de Biología Tropical* 54(Suppl. 3): 175–188.

Butler TH (1964) Redescription of the parasitic isopod *Holophryxus alaskensis* Richardson, and a note on its synonymy. *Journal of the Fisheries Research Board of Canada* 21(5): 971–976. <https://doi.org/10.1139/f64-090>

Cadien D (1996) SCAMIT voucher sheet for *Paramunna* sp A (Pleurogoniidae). Specimen examined and vouchered by D Cadien, 30 May 1996. *SCAMIT Newsletter* 15(2): 2. <https://www.scamit.org/newsletters>

Cadien D (2008) SCAMIT voucher sheet for *Boreosignum* sp IS1 (Isopoda, Family Paramunidae). Specimens examined and vouchered by DB Cadien, 5 April 2008. <https://www.scamit.org/tools>

Cadien D, Brusca RC (1993) Anthuridean isopods (Crustacea) of California and the temperate northeast Pacific. *SCAMIT Newsletter* 12(6): 1–26. <https://www.scamit.org/newsletters>

Calman WT (1898) On a collection of Crustacea from Puget Sound (Puget Sound Zoology, Columbia University Contributions No. 9). *Annals of the New York Academy of Sciences* 11(13): 259–292. <https://doi.org/10.1111/j.1749-6632.1898.tb54972.x>

Campos E, de Campos AR (1990) Taxonomic remarks on *Schizobopyrina* Markham, 1985, with the description of *S. bruscai* (Crustacea: Isopoda: Bopyridae). *Proceedings of the Biological Society of Washington* 103(3): 633–642.

Campos E, de Campos AR (1998) Taxonomy and distribution of the parasitic isopod *Progebiophilus bruscai* Salazar-Vallejo and Leija-Tristán, 1990 (Crustacea: Bopyridae). *Proceedings of the Biological Society of Washington* 111: 288–294.

Campos E, Villarreal G (2008) Littoral and shallow water isopods from Todos los Santos Bay, Baja California, México. *Revista Mexicana de Biodiversidad* 79: 347–354. <https://doi.org/10.22201/ib.20078706e.2008.002.566>

Campos-Filho IS, Cardoso GM, Aguiar JO (2018) New species and first record of *Alloniscus* Dana, 1854 (Isopoda: Oniscidae: Alloniscidae) from Brazil. *Nauplius* 26(0): e2018014. <https://doi.org/10.1590/2358-2936e2018014>

Campos-González E, Campoy-Favela JR (1987) Epicarideans from Baja California 1. First record and bioecological notes on two Bopyridae and one Cryptoniscidae (Crustacea, Isopoda) for Mexico. *Ciencias Marinas* 13(3): 39–48. <https://doi.org/10.7773/cm.v13i3.543>

Campos-González E, Ruiz-Campos G, Macías-Chávez JL (1986) Nuevos huespedes para *Lironeca menziesi* Brusca, 1981 (Crustacea, isopoda, Cymothoidae) con algunos comentarios sobre preferencia por los mismos. *Ciencias Marinas* 12(2): 99–104. <https://doi.org/10.7773/cm.v12i2.505>

Cardoso L, Martins ML, De Aquino Golzio JES, Bomfim CNC, De Oliveira RLM, Dos Santos LBG, Lacerda ACF (2017) *Rocinela signata* (Isopoda: Aegidae) parasitizing the gills of the spotted goatfish *Pseudupeneus maculatus* (Actinopterygii: Mullidae) in Northeastern Brazil. *Anais da Academia Brasileira de Ciências* 89(3, Supplement): 2075–2080. <https://doi.org/10.1590/0001-3765201720150677>

Carlton JT (1979) Introduced invertebrates of San Francisco Bay. In: Conomos TJ (Ed.) *San Francisco Bay: the Urbanized Estuary*. California Academy of Sciences, San Francisco, 427–444.

Carlton JT, Iverson EW (1981) Biogeography and natural history of *Sphaeroma walkeri* Stebbing (Crustacea: Isopoda) and its introduction to San Diego Bay, California. *Journal of Natural History* 15(1): 31–48. <https://doi.org/10.1080/00222938100770031>

Carvacho A (1983) Asellota del golfo de California, con descripción de dos nuevos géneros y dos nuevas especies (Crustacea, Isopoda). *Cahiers de Biologie Marine* 24: 281–295.

Castellanos C, Junoy J (2005) *Synisoma albertoi*, a new species from the Strait of Gibraltar (southern Spain) with a key to known species of the genus (Crustacea: Isopoda: Idoteidae). *Journal of the Marine Biological Association of the United Kingdom* 85(6): 1461–1466. <https://doi.org/10.1017/S0025315405012646>

Cavalcanti E, Do Nascimento S, Barros N, Chellappa S (2012) Occurrence of the isopod parasite *Rocinela signata* (Isopoda: Aegidae) on marine fish *Sparisoma frondosum* (Osteichthyes: Scaridae). *Marine Biodiversity Records* 5: e66. <https://doi.org/10.1017/S1755267212000516>

Chapman JW, Dumbauld BR, Itani G, Markham JC (2012) An introduced Asian parasite threatens northeastern Pacific estuarine ecosystems. *Biological Invasions* 14(6): 1221–1236. <https://doi.org/10.1007/s10530-011-0151-3>

Chess JR, Hobson ES (1997) Benthic invertebrates of four southern California marine habitats prior to onset of ocean warming in 1976, with lists of fish predators. NOAA Technical Memorandum NMFS-SWFSC-243, 110 pp. <https://repository.library.noaa.gov/view/noaa/3013>

Chilton C (1892) Notes on some New Zealand Amphipoda and Isopoda. *Transactions of the New Zealand Institute* 24: 258–269.

City of Los Angeles (2021) Marine Monitoring in Santa Monica Bay Biennial Assessment Report 2019-2020. Department of Public Works, Environmental Monitoring Division, LA Sanitation & Environment, Hyperion Water Reclamation Plant, Playa del Rey, 226 pp. [+ appendices] <https://www.lacitysan.org/san/sandocview?docname=cnt068942>

City of San Diego (2018) Biennial Receiving Waters Monitoring and Assessment Report for the Point Loma and South Bay Ocean Outfalls, 2016–2017. City of San Diego, Public Utilities

Department, Environmental Monitoring and Technical Services Division, San Diego, California, 210 pp. [https://www.sandiego.gov/sites/default/files/2016\\_2017\\_biennial\\_rpt.pdf](https://www.sandiego.gov/sites/default/files/2016_2017_biennial_rpt.pdf)

Cohen BF (1998) Dendrotiidae (Crustacea: Isopoda) of the southeastern Australian continental slope. *Memoirs of the Museum of Victoria* 57(1): 1–38. <https://doi.org/10.24199/j.mmv.1998.57.01>

Cohen AN, Carlton JT (1995) Biological Study. Nonindigenous aquatic species in a United States estuary: A case study of the biological invasions of the San Francisco Bay and Delta. U.S. Fish and Wildlife Service, Washington, DC, 246 pp.

Cohen BF, Poore GCB (1994) Phylogeny and biogeography of the Gnathiidae (Crustacea, Isopoda) with descriptions of new genera and species, most from south-eastern Australia. *Memoirs of the Museum of Victoria* 54(2): 271–397. <https://doi.org/10.24199/j.mmv.1994.54.13>

Cohen AN, Harris LH, Bingham BL, Carlton JT, Chapman JW, Lambert CC, Lambert G, Ljubenkov JC, Murray SN, Rao LC, Reardon K, Schwindt E (2005) Rapid Assessment Survey for exotic organisms in southern California bays and harbors, and abundance in port and non-port areas. *Biological Invasions* 7(6): 995–1002. <https://doi.org/10.1007/s10530-004-3121-1>

Cooke WJ (1977) On the occurrence of the commensal isopod *Caecijaera horvathi* Menzies, 1951, in Hawaii. *Crustaceana* 33(1): 105–106. <https://doi.org/10.1163/156854077X00322>

Cookson LJ (1991) Australasian species of Limnoriidae (Crustacea: Isopoda). *Memoirs of the Museum of Victoria* 52(2): 137–262. <https://doi.org/10.24199/j.mmv.1991.52.02>

Cookson LJ (1997) Additions to the taxonomy of the Limnoriidae. *Memoirs of the Museum of Victoria* 56(1): 129–143. <https://doi.org/10.24199/j.mmv.1997.56.07>

Coyle KO, Mueller GJ (1981) Larval and juvenile stages of the isopod *Holophryxus alaskensis* (Epicarida, Dajidae) parasitic on decapods. *Canadian Journal of Fisheries and Aquatic Sciences* 38(11): 1438–1443. <https://doi.org/10.1139/f81-190>

Crisp DJ (1968) Distribution of the parasitic isopod *Hemioniscus balani* with special reference to the east coast of North America. *Journal of the Fisheries Research Board of Canada* 25(6): 1161–1167. <https://doi.org/10.1139/f68-102>

Cruz-García R, Cupul-Magana AL, Hendrickx ME, Rodríguez-Troncoso AP (2013) Abundance of three species of Isopoda (Peracarida, Isopoda) associated with a coral reef environment in Pacific Mexico. *Crustaceana* 86(13–14): 1664–1674. <https://doi.org/10.1163/15685403-00003264>

Cunha MR, Wilson GDF (2003) Haplomunnidae (Crustacea: Isopoda) reviewed, with a description of an intact specimen of *Thylakogaster* Wilson & Hessler, 1974. *Zootaxa* 326(1): 1–16. <https://doi.org/10.11646/zootaxa.326.1.1>

Dana JD (1852) On the classification of the Crustacea Choristopoda or Tetrade-capoda. *The American Journal of Science and Arts. Second Series* 14 (41): 297–316.

Dana JD (1853) United States Exploring Expedition during the years 1838, 1839, 1840, 1841, 1842, under the command of Charles Wilkes, U.S.N. Vol. XIII. Crustacea. Part II: 692–1618. [dated 1852, but published 1853]

Dana JD (1854) Catalogue and descriptions of Crustacea collected in California by Dr. John L. Leconte. *Proceedings of the Philadelphia Academy of Natural Sciences* 7: 175–177.

Davidson TM, de Rivera CE (2010) Accelerated erosion of saltmarshes infested by the non-native burrowing crustacean *Sphaeroma quoianum*. *Marine Ecology Progress Series* 419: 129–136. <https://doi.org/10.3354/meps08836>

Davidson TM, Shanks AL, Rumrill SS (2010) The composition and density of fauna utilizing burrow microhabitats created by a non-native burrowing crustacean (*Sphaeroma quoianum*). *Biological Invasions* 12(5): 1403–1413. <https://doi.org/10.1007/s10530-009-9556-7>

Delaney PM (1982) The synonymy of *Excorallana kathyae* Menzies, 1962, with *Excorallana truncata* (Richardson, 1899), with a redescription of the species (Crustacea, Isopoda, Excorallanidae). *Journal of Crustacean Biology* 2(2): 273–280. <https://doi.org/10.2307/1548008>

Delaney PM (1984) Isopods of the genus *Excorallana* Stebbing, 1904 from the Gulf of California, Mexico (Crustacea, Isopoda, Corallanidae). *Bulletin of Marine Science* 34: 1–20.

Delaney PM (1989) Phylogeny and biogeography of the marine isopod family Corallanidae (Crustacea, Isopoda, Flabellifera). *Natural History Museum of Los Angeles County. Contributions in Science* 409: 1–75. <https://doi.org/10.5962/p.226815>

Delaney PM (1993) X-ray microanalysis of the cuticle surface of two southern California marine isopod species. *Bulletin of the Southern California Academy of Sciences* 92: 64–69.

Delaney PM, Brusca RC (1985) Two new species of *Tridentella* Richardson, 1905 (Isopoda: Flabellifera: Tridentellidae) from California, with a rediagnosis and comments on the family, and a key to the genera of Tridentellidae and Corallanidae. *Journal of Crustacean Biology* 5(4): 728–742. <https://doi.org/10.2307/1548249>

Dexter DM (1976) The sandy-beach fauna of Mexico. *The Southwestern Naturalist* 20(4): 479–485. <https://doi.org/10.2307/3669864>

Dexter DM (1983) Soft bottom infaunal communities in Mission Bay. *California Fish and Game* 69(1): 5–17.

Dollfus A (1895) Voyage de M.E. Simon dans l’Afrique australe (Janvier-Avril 1893). Crustaces isopodes terrestres. *Mémoires de la Société Zoologique de France* 8: 345–352.

Dollfus A (1901) Étude préliminaire des Gnathiidae recueillis dans les campagnes de l’Hirondelle et de La Princesse-Alice. *Bulletin de la Société Zoologique de France* 26: 239–246.

Doti BL, Wilson GDF (2010) The genera *Carpias* Richardson, *Ianiropsis* Sars and *Janaira* Moreira & Pires (Isopoda: Asellota: Janiridae) from Australia, with description of three new species. *Zootaxa* 2625(1): 1–39. <https://doi.org/10.11646/zootaxa.2625.1.1>

Dow TG (1958) Description of a new isopod from California, *Exosphaeroma inornata*. *Bulletin of the Southern California Academy of Sciences* 57(2): 93–97.

Dumbauld BR, Chapman JW, Torchin ME, Kuris AM (2011) Is the collapse of mud shrimp (*Upogebia pugettensis*) populations along the pacific coast of North America caused by outbreaks of a previously unknown bopyrid isopod parasite (*Orthione griffenis*)? *Estuaries and Coasts* 34(2): 336–350. <https://doi.org/10.1007/s12237-010-9316-z>

Eberl R (2012) Distribution, habitat and food preferences of sympatric high intertidal isopod species *Ligia occidentalis* and *Ligia pallasii* (Ligiidae: Oniscidea). *Journal of Natural History* 46(29–30): 1779–1797. <https://doi.org/10.1080/00222933.2012.700334>

Eberl R, Mateos M, Grosberg RK, Santamaria CA, Hurtado LA (2013) Phylogeography of the supralittoral isopod *Ligia occidentalis* around the Point Conception marine biogeographical boundary. *Journal of Biogeography* 40(12): 2361–2372. <https://doi.org/10.1111/jbi.12168>

Eman MY, Nahla HS, Eissa IAM, Mona SZ (2014) Parasitological studies on the Isopoda (Cymothoidae) parasites infesting some marine fishes at Suez Canal area at Ismailia Province, Egypt with a key to the cymothoid genera. *Life Science Journal* 11(1): 227–231.

Espinosa-Pérez MC, Hendrickx ME (2001a) Checklist of isopods (Crustacea: Peracarid: Isopoda) from the eastern tropical Pacific. *Belgian Journal of Zoology* 131(1): 43–55.

Espinosa-Pérez MC, Hendrickx ME (2001b) The genus *Paracerceis* Hansen, 1905 (Isopoda, Sphaeromatidae) in the eastern tropical Pacific, with the description of a new species. *Crustaceana* 74(11): 1169–1187. <https://doi.org/10.1163/15685400152885165>

Espinosa-Pérez MC, Hendrickx ME (2002) Distribution and ecology of isopods (Crustacea: Peracarida: Isopoda) of the Pacific coast of Mexico. In: Escobar-Briones E, Alvarez F (Eds) *Modern approaches to the study of Crustacea*. Springer, Boston, 95–103. [https://doi.org/10.1007/978-1-4615-0761-1\\_16](https://doi.org/10.1007/978-1-4615-0761-1_16)

Espinosa-Pérez MC, Hendrickx ME (2006) A comparative analysis of biodiversity and distribution of shallow-water marine isopods (Crustacea: Isopoda) from polar and temperate waters in the East Pacific. *Belgian Journal of Zoology* 136(2): 219–247.

Espinosa-Pérez MC, Hendrickx ME, Morrone JJ (2009) Identification of generalized tracks for the species of Isopoda (Peracarida) from the Eastern Pacific. *Journal of Crustacean Biology* 29(2): 224–231. <https://doi.org/10.1651/08-3074R.1>

Esquete P, Wilson GDF (2016) The genus *Uromunna* (Crustacea: Isopoda: Munnidae) in New South Wales, with a key for all known species. *Marine Biology Research* 2016(online): 1–25. <https://doi.org/10.1080/17451000.2015.1131298>

Esteves-Silva PH, Oliveira MSB, Gentil-Vasconcelos HC, Costa-Campos CE, Tavares-Dias M (2020) New records of hosts for *Excorallana longicornis* and *Nerocila acuminata* (Crustacea: Isopoda) in brackish fish from the coast of the State of Amapá (Brazil), with an update on the geographic distribution of *Nerocila acuminata*. *Journal of Parasitic Diseases* 44(2): 420–428. <https://doi.org/10.1007/s12639-020-01192-x>

Fairey R, Dunn R, Roberts C, Sigala M, Oliver J (2002) *Introduced Aquatic Species in California Coastal Waters. Final Report (July 2002)*. California Department of Fish and Game. Sacramento, 116 pp.

Fee AR (1927) The Isopoda of Departure Bay and vicinity, with descriptions of new species, variations, and colour notes. *Contributions to Canadian Biology and Fisheries* 3(1): 15–46. [Published 13 Jan 1927] <https://doi.org/10.1139/f26-002>

Fogg AQ, Ruiz CF, Curran SS, Bullard SA (2016) Parasites from the red lionfish, *Pterois volitans* from the Gulf of Mexico. *Gulf and Caribbean Research* 27(1): SC1–SC5. <https://doi.org/10.18785/gcr.2701.07>

Franke HD, Gutow L, Janke M (1998) The recent arrival of the oceanic isopod *Idotea metallica* Bosc off Helgoland (German Bight, North Sea): An indication of a warming trend in the North Sea? *Helgoländer Meeresuntersuchungen* 52(3–4): 347–357. <https://doi.org/10.1007/BF02908908>

Galassi DMP, Bruce NL, Fiasca B, Dole-Oliver M-J (2016) A new family Lepidocharontidae with description of *Lepidocharon* gen. n., from the Great Barrier Reef, Australia, and re-definition of the Microparasellidae (Isopoda, Asellota). *ZooKeys* 594: 11–50. <https://doi.org/10.3897/zookeys.594.7539>

Galil BS (2008) *Sphaeroma walkeri* Stebbing, 1905 (Crustacea: Isopoda: Sphaeromatidae) established on the Mediterranean coast of Israel. *Aquatic Invasions* 3(4): 443–444. <https://doi.org/10.3391/ai.2008.3.4.13>

García-Madrigal MS, Pérez-Enriquez VI, Jarquín-Martínez U (2022) Crustáceos (Arthropoda: Crustacea). In: Bastida-Zavala JR, García-Madrigal MS (Eds) Invertebrados Marinos y Costeros del Pacífico sur de México. Universidad del Mar y Geomare, Puerto Ángel, Oaxaca, México, 199–275.

Garthwaite RL, Lawson R (1992) Oniscidea (Isopoda) of the San Francisco Bay area. Proceedings of the California Academy of Sciences 47(11): 303–328.

Garthwaite RL, Hochberg FG, Sassaman C (1985) The occurrence and distribution of terrestrial isopods (Oniscoidea) on Santa Cruz Island with preliminary data for the other California islands. Bulletin of the Southern California Academy of Sciences 84: 23–37.

Garthwaite RL, Lawson R, Taiti S (1992) Morphological and genetic relationships among four species of *Armadilloniscus* Uljanin, 1875 (Isopoda: Oniscidea: Scyphacidae). Journal of Natural History 26(2): 327–338. <https://doi.org/10.1080/00222939200770171>

Garzón-Ferreira J (1990) An isopod, *Rocinela signata* (Crustacea: Isopoda: Aegidae), that attacks humans. Bulletin of Marine Science 46(3): 813–815.

George RY, Strömberg JO (1968) Some new species and new records of marine isopods from San Juan Archipelago, Washington, U.S.A. Crustaceana 14: 225–254. <https://doi.org/10.1163/156854068X00827>

Gillard RM [Ed.] (1978) POCS Reference Paper No. III. Benthic organisms and estuarine communities of the Southern California Bight. U.S. Department of the Interior, Bureau of Land Management, Pacific Outer Continental Shelf Office. Los Angeles, 221 pp.

Gillett DJ, Lovell LL, Schiff KC (2017) Southern California Bight 2013 Regional Monitoring Program: Vol. VI. Benthic Infauna. Technical Report 971. Southern California Coastal Water Research Project, Costa Mesa, 300 pp. <https://www.sccwrp.org/publications>

Gillett DJ, Gilbane L, Schiff KC (2019) Benthic Infauna of the Southern California Bight Continental Slope: Characterizing Community Structure for the Development of an Index of Disturbance. U.S. Department of the Interior, Bureau of Ocean Energy Management, Camarillo. OCS Study BOEM 2019-050, 157 pp.

Gillett DJ, Enright W, Walker JB (2022) Southern California Bight 2018 Regional Monitoring Program: Vol. III. Benthic Infauna. Technical Report 1289. Southern California Coastal Water Research Project. Costa Mesa, 61 pp. [+ appendices] <https://www.sccwrp.org/publications>

Glynn PW (1976) A new shallow-water serolid (Isopoda: Flabellifera) from the Pacific coast of Panamá. Journal of Natural History 10(1): 7–16. <https://doi.org/10.1080/00222937600770021>

Glynn PW, Glynn CS (1974) On the systematics of *Ancinus* (Isopoda, Sphaeromatidae), with the description of a new species from the tropical eastern Pacific. Pacific Science 28(4): 401–422.

Golovan OA, Malyutina MV (2022) The first record of the family Paramunnidae (Isopoda: Asellota) from the bathyal of the Bering Sea with descriptions of two new species of *Munnogonium*. Deep-sea Research. Part II, Topical Studies in Oceanography 200: 105095. <https://doi.org/10.1016/j.dsr2.2022.105095>

Golovan OA, Malyutina MV, Brandt A (2018) First record of the deep-sea isopod family Dendronidae (Isopoda: Asellota) from the Northwest Pacific with description of two new species of *Dendromunna*. Marine Biodiversity 48(1): 531–544. <https://doi.org/10.1007/s12526-017-0725-0>

Gurjanova EF (1933) Contribution to the Isopoda-Fauna of the Pacific Ocean. II. New species of Gnathiidea and Asellota. Issledovaniia Fauny Morei: Akademiiia nauk SSSR 19: 79–91.

Guzman HM, Obando VL, Brusca RC, Delaney PM (1988) Aspects of the population biology of the marine isopod *Excorallana tricornis occidentalis* Richardson, 1905 (Crustacea: Isopoda: Corallanidae) at Cano Island, Pacific Costa Rica. *Bulletin of Marine Science* 43(1): 77–87.

Hadfield KA, Smit NJ (2020) Review of the global distribution and hosts of the economically important fish parasitic isopod genus *Ceratothoa* (Isopoda: Cymothoidae), including the description of *Ceratothoa springbok* n. sp. from South Africa. *International Journal for Parasitology* 50(10–11): 899–919. <https://doi.org/10.1016/j.ijpara.2020.07.001>

Hadfield KA, Bruce NL, Smit NJ (2016) Redescription of poorly known species of *Ceratothoa* Dana, 1852 (Crustacea, Isopoda, Cymothoidae) based on original type material. *ZooKeys* 592: 39–91. <https://doi.org/10.3897/zookeys.592.8098>

Haney L (2006) Pairing Northeast Pacific gnathiid isopods. Which females go with what males? *SCAMIT Newsletter*, Supplement to Vol. 24(6): 37. <https://www.scamit.org/newsletters>

Hansen HJ (1897) Reports on the dredging operations off the west coast of Central America to the Galapagos Islands, to the west coast of Mexico, and in the Gulf of California, in charge of Alexander Agassiz, carried on by the U.S. Fish Commission Steamer Albatross during 1891, Lieut. Commander Z.L. Tanner, U.S. Navy, commanding. XXII. The Isopods. *Bulletin of the Museum of Comparative Zoology at Harvard College* 31(5): 95–129.

Hardisty AR, Ellwood ER, Nelson G, Zimkus B, Buschbom J, Addink W, Rabeler RK, Bates J, Bentley A, Fortes JAB, Hansen S, Macklin JA, Mast AR, Miller JT, Monfils AK, Paul DL, Wallis E, Webster M (2022) Digital extended specimens: Enabling an extensible network of biodiversity data records as integrated digital objects on the Internet. *Bioscience* 72(10): 978–987. <https://doi.org/10.1093/biosci/biac060>

Harrison K (1984) Some sphaeromatid isopods (Crustacea) from southern and south-western Australia, with the description of a new genus and two new species. *Records of the Western Australian Museum* 11(3): 259–286.

Harrison K, Ellis JP (1991) The genera of the Sphaeromatidae (Crustacea: Isopoda): a key and distribution list. *Invertebrate Taxonomy* 5(4): 915–952. <https://doi.org/10.1071/IT9910915>

Harrison K, Holdich DM (1982) Revision of the genera *Dynamenella*, *Ischyromene*, *Dynamenopsis*, and *Cymodocella* (Crustacea: Isopoda), including a new genus and five new species of eubranchiate sphaeromatids from Queensland waters. *Journal of Crustacean Biology* 1(1): 84–119. <https://doi.org/10.2307/1548115>

Harrison K, Holdich DM (1984) Hemibranchiate sphaeromatids (Crustacea: Isopoda) from Queensland, Australia, with a world-wide review of the genera discussed. *Zoological Journal of the Linnean Society* 81(4): 275–387. <https://doi.org/10.1111/j.1096-3642.1984.tb01175.x>

Harrison K, Poore GCB (1984) *Serolis* (Crustacea, Isopoda, Serolidae) from Australia, with a new species from Victoria. *Memoirs of the Museum of Victoria* 45(1): 13–31. <https://doi.org/10.24199/j.mmv.1984.45.03>

Harty R (1979) Range extension and notes on the habitat of the isopod *Munna halei* Menzies. *Bulletin of the Southern California Academy of Sciences* 78(3): 196–199.

Hata H, Sogabe A, Tada S, Nishimoto R, Nakano R, Kohya N, Takeshima H, Kawanishi R (2017) Molecular phylogeny of obligate fish parasites of the family Cymothoidae (Isopoda, Crustacea): Evolution of the attachment mode to host fish and the habitat shift from saline water to freshwater. *Marine Biology* 164(5): 1–15. <https://doi.org/10.1007/s00227-017-3138-5>

Hatch MH (1947) The Chelifera and Isopoda of Washington and adjacent regions. University of Washington Publications in Biology 10(5): 155–274.

Healey D, Hovel KA (2004) Seagrass bed patchiness: Effects on epifaunal communities in San Diego Bay, USA. Journal of Experimental Marine Biology and Ecology 313(1): 155–174. <https://doi.org/10.1016/j.jembe.2004.08.002>

Heberling JM, Miller JT, Noesgaard D, Weingart SB, Schigel D (2021) Data integration enables global biodiversity synthesis. Proceedings of the National Academy of Sciences of the United States of America 118(6): e2018093118. <https://doi.org/10.1073/pnas.2018093118>

Hedo G, Junoy J (1999) A new species of *Synisoma* (Isopoda: Valvifera: Idoteidae) from the Strait of Gibraltar and the Alborán Sea (Spain, western Mediterranean). Cahiers de Biologie Marine 40: 87–92.

Hedrick BP, Heberling JM, Meineke EK, Turner KG, Grassa CJ, Park DS, Kennedy J, Clarke JA, Cook JA, Blackburn DC, Edwards SV, Davis CC (2020) Digitization and the future of natural history collections. Bioscience 70(3): 243–251. <https://doi.org/10.1093/biosci/biz163>

Hendrickx ME (2008) Rediscovery of *Rocinela murilloi* Brusca & Iverson, 1985 (Isopoda, Aegidae) in the Gulf of California, Mexico, and ecological data associated with its capture. Crustaceana 81(10): 1259–1262. <https://doi.org/10.1163/156854008X374586>

Hendrickx ME (2018a) Additional distribution and ecology records of the deep-water isopod *Rocinela murilloi* Brusca & Iverson, 1985 (Isopoda, Aegidae) in western Mexico. Nauplius 26: e2018036. <https://doi.org/10.1590/2358-2936e2018036>

Hendrickx ME (2018b) Notes on two shallow water isopods (Crustacea: Peracarida: Isopoda: Idoteidae) from Kino Bay, Gulf of California, Mexico. Nauplius 26: e2018027. <https://doi.org/10.1590/2358-2936e2018027>

Hendrickx ME, Espinosa-Pérez MC, Salgado-Barragan J, Mendez-Ubach MN (1997) Isópodos (Crustacea: Isopoda). In: Estación Mazatlán U, ICML (Eds) Tercer Catálogo de la Colección de Referencia de Invertebrados. Estación Mazatlán, ICML, UNAM México: Comisión Nacional para el Conocimiento y Uso de la Biodiversidad e Instituto de Ciencias del Mar y Limnología, UNAM, México, 27–49.

Henkel SK, Gilbane L, Phillips AJ, Gillett DJ (2020) Cross-shelf habitat suitability modeling for benthic macrofauna. Camarillo (CA): US Department of the Interior, Bureau of Ocean Energy Management. OCS Study BOEM 2020-008, 71 pp.

Hessler RR (1972) The relationship between *Serolis carinata* Lockington and *Serolis mgrayi* Menzies and Frankenberg (Isopoda, Flabellifera). Crustaceana (Supplement 3): 1–6. <https://www.jstor.org/stable/25027403>

Hessler RR, Thistle D (1975) On the place of origin of the deep-sea isopods. Marine Biology 32(2): 155–165. <https://doi.org/10.1007/BF00388508>

Hessler RR, Wilson GD, Thistle D (1979) The deep-sea isopods: A biogeographic and phylogenetic overview. Sarsia 64(1–2): 67–75. <https://doi.org/10.1080/00364827.1979.10411365>

Hewatt WG (1946) Marine ecological studies on Santa Cruz Island, California. Ecological Monographs 16(3): 185–210. <https://doi.org/10.2307/1948649>

Hewitt C, Campbell M (2001) The Australian distribution of the introduced sphaeromatid isopod, *Paracerceis sculpta*. Crustaceana 74(9): 925–936. <https://doi.org/10.1163/15685400152682674>

Higley DL, Holton RL (1978) A grab-sample study of the benthic invertebrates of the Columbia River Estuary. Supplemental Data Report 1 November 1975 through 29 February 1976 [Supplement to Reference 76-3]. Submitted to Port of Astoria, Astoria, Oregon, 27 pp.

Hinton S (1987) Seashore Life of Southern California. Revised edn. University of California Press, Berkeley, Los Angeles, London, 217 pp.

Hinton SA, Emmett RL (1994) Benthic infaunal, sediment, and fish offshore from the Columbia River, July 1992. Report to the U.S. Army Corps of Engineers, Contract E96920040, 60 pp. [+ appendices] [Available from Northwest Fisheries Science Center, 2725 Montlake Boulevard East, Seattle, WA 98112]

Hinton SA, Emmett RL (1996) Benthic infauna and sediment characteristics offshore from the Columbia River, August 1994. Report to the U.S. Army Corps of Engineers, Contract E96930048, 30 pp. [+ appendices] [Available from Northwest Fisheries Science Center, 2725 Montlake Boulevard East, Seattle, WA 98112]

Hobson ES, Chess JR (1986) Relationships among fishes and their prey in a nearshore sand community off southern California. *Environmental Biology of Fishes* 17(3): 201–226. <https://doi.org/10.1007/BF00002096>

Holmes S (1904) Remarks on the sexes of sphaeromids, with a description of a new species of *Dynamene*. *Proceedings of the California Academy of Sciences, Third Series Zoology* 3(11): 295–306.

Holmes S, Gay ME (1909) Four new species of isopods from the coast of California. *Proceedings of the United States National Museum* 36(1670): 375–379. <https://doi.org/10.5479/si.00963801.36-1670.375>

Holthuis LB (1949) The Isopoda and Tanaidacea of the Netherlands, including the description of a new species of *Limnoria*. *Zoologische Mededelingen Rijksmuseum Van Natuurlijke Historie te Leiden* 30: 163–190.

Hong J-S, Lee C-L, Min G-S (2015) Occurrence of *Orthione griffenis* Markham, 2004 (Isopoda: Bopyridae), parasite of the mud shrimp *Upogebia major* (De Haan, 1841) in South Korean Waters, and its implications with respect to marine bioinvasion. *Journal of Crustacean Biology* 35(5): 605–615. <https://doi.org/10.1163/1937240X-00002361>

Hubbard DM, Dugan JE, Schooler NK, Viola SM (2014) Local extirpations and regional declines of endemic upper beach invertebrates in southern California. *Estuarine, Coastal and Shelf Science* 150: 67–75. <https://doi.org/10.1016/j.ecss.2013.06.017>

Hunt SL, Mulligan TJ, Komori K (1999) Oceanic feeding habits of chinook salmon, *Oncorhynchus tshawytscha*, off northern California. *Fish Bulletin* 97(3): 717–721.

Hurley DE, Jansen KP (1977) The marine fauna of New Zealand: Family Sphaeromatidae (Crustacea: Isopoda: Flabellifera). *New Zealand Oceanographic Institute Memoir* 63: 1–95.

Hurtado LA, Mateos M, Santamaria CA (2010) Phylogeography of supralittoral rocky intertidal *Ligia* isopods in the Pacific Region from Central California to Central Mexico. *PLoS ONE* 5(7): e11633. <https://doi.org/10.1371/journal.pone.0011633>

Hwang H, Kang J, Cho IY, Kang DW, Paek WK, Lee SH (2014) Benthic invertebrate fauna in the islets of Namuseom and Bukhyeongjeseom off Busan. *Journal of Asia-Pacific Biodiversity* 7(2): e206–e212. <https://doi.org/10.1016/j.japb.2014.03.009>

Iverson EW (1972) A new subtidal *Synidotea* from central California (Crustacea: Isopoda). *Proceedings of the Biological Society of Washington* 85(47): 541–548.

Iverson EW (1974) Range extensions for some California marine isopod crustaceans. *Bulletin of the Southern California Academy of Sciences* 73(3): 164–169.

Iverson EW (1978) Status of *Exosphaeroma inornata* Dow and *E. media* George and Stromberg (Isopoda: Sphaeromatidae) with ecological notes. *Journal of the Fisheries Research Board of Canada* 35(10): 1381–1384. <https://doi.org/10.1139/f78-218>

Iverson EW (1982) Revision of the isopod family Sphaeromatidae (Crustacea: Isopoda: Flabellifera) I. Subfamily names with diagnoses and key. *Journal of Crustacean Biology* 2(2): 248–254. <https://doi.org/10.2307/1548005>

Iverson EW, Chivers DD (1984) A new genus and species of Sphaeromatidae (Crustacea: Isopoda: Flabellifera) from the Miocene of Kern County, California. *Journal of Paleontology* 58(1): 104–108. <http://www.jstor.org/stable/1304737>

Iverson EW, Wilson GDF (1981) *Paramunna quadratifrons*, new species, the first record of the genus in the North Pacific Ocean (Crustacea: Isopoda: Pleurogoniidae). *Proceedings of the Biological Society of Washington* 85(47): 541–548.

Iwasa M (1934) Description of a new isopod crustacean (Sphaeromidae) from Hokkaido. *Proceedings of the Imperial Academy* 10(6): 370–373. <https://doi.org/10.2183/pjab1912.10.370>

Jang IK, Kwon DH (1990) *Ianiropsis* (Isopoda, Asellota, Ianiridae) from Korea, with description of a new species. *Korean Journal of Systematic Zoology* 6(2): 193–208.

Jass J, Klausmeier B (2000) Endemics and immigrants: North American terrestrial isopods (Isopoda, Oniscidea) north of Mexico. *Crustaceana* 73(7): 771–799. <https://doi.org/10.1163/156854000504804>

Jass J, Klausmeier B (2001) Terrestrial isopod (Crustacea: Isopoda) atlas for Canada, Alaska, and the contiguous United States. *Milwaukee Public Museum Contributions in Biology and Geology* 95: 1–105.

Jay CV (1989) Prevalence, size and fecundity of the parasitic isopod *Argeia pugettensis* on its host shrimp *Crangon francisorum*. *American Midland Naturalist* 121(1): 68–77. <https://doi.org/10.2307/2425657>

Johnson WS (1976a) Biology and population dynamics of the intertidal isopod *Cirolana harfordi*. *Marine Biology* 36(4): 343–350. <https://doi.org/10.1007/BF00389196>

Johnson WS (1976b) Population energetics of the intertidal isopod *Cirolana harfordi*. *Marine Biology* 36(4): 351–357. <https://doi.org/10.1007/BF00389197>

Johnson ME, Snook HJ (1967) *Seashore Animals of the Pacific Coast*. (Reprint of 1927 edn.). Dover Publications, New York, 659 pp.

Jorgensen P, Ibarra-Obando SE, Carriquiry JD (2007) Top-down and bottom-up stabilizing mechanisms in eelgrass meadows differentially affected by coastal upwelling. *Marine Ecology Progress Series* 333: 81–93. <https://doi.org/10.3354/meps333081>

Just J, Wilson GDF (2004) Revision of the *Paramunna* complex (Isopoda: Asellota: Paramunnidae). *Invertebrate Systematics* 18(4): 377–466. <https://doi.org/10.1071/IS03027>

Just J, Wilson GDF (2007) Revision of *Austrosignum* Hodgson and *Munnogonium* George & Stromberg (Paramunnidae) with descriptions of eight new genera and two new species (Crustacea: Isopoda: Asellota). *Zootaxa* 1515(1): 1–29. <https://doi.org/10.11646/zootaxa.1515.1.1>

Just J, Wilson GDF (2021) Redescriptions and new species in the '*Austrosignum–Munnogonium*' complex sensu Just and Wilson (2007), mainly from the Southern Hemisphere (Crustacea: Isopoda: Paramunnidae). *Zootaxa* 4952(3): 401–447. <https://doi.org/10.11646/zootaxa.4952.3.1>

Kalman JE (2006) Ectoparasites of demersal marine fishes in Santa Monica Bay, California, U.S.A., with 31 new host records and three range extensions. *Comparative Parasitology* 73(2): 201–213. <https://doi.org/10.1654/4190.1>

Kaneko K, Omori M (2005) Life history and utilization of the beach face slope by the sandy beach isopod *Excirolana chiltoni* in Sendai Bay, northern Japan. *Crustacean Research* 34: 27–39. [https://doi.org/10.18353/crustacea.34.0\\_27](https://doi.org/10.18353/crustacea.34.0_27)

Keable SJ (2006) Taxonomic revision of *Natatolana* (Crustacea: Isopoda: Cirolanidae). *Records of the Australian Museum* 58(2): 133–244. <https://doi.org/10.3853/j.0067-1975.58.2006.1469>

Kensley B (1978) Five new genera of anthurid isopod crustaceans. *Proceedings of the Biological Society of Washington* 91(3): 775–792.

Kensley B (1984) The Atlantic Barrier Reef Ecosystem at Carrie Bow Cay, Belize, III: New marine Isopoda. *Smithsonian Contributions to Marine Sciences* 24, [iv +] 81 pp. <https://doi.org/10.5479/si.01960768.24.1>

Kensley B, Clark K (1998) A new isopod species from Key Largo, Florida (Crustacea: Isopoda: Holognathidae). *Proceedings of the Biological Society of Washington* 111(2): 314–319.

Kensley B, Heard RW (1997) *Tridentella ornata* (Richardson 1911), new combination: records of hosts and localities (Crustacea: Isopoda: Tridentellidae). *Proceedings of the Biological Society of Washington* 110(3): 422–425.

Kensley B, Kaufman HW (1978) *Cleantiooides*, a new idoteid isopod genus from Baja California and Panama. *Proceedings of the Biological Society of Washington* 91(3): 658–665.

Kensley B, Schotte M (1989) Guide to the Marine Isopod Crustaceans of the Caribbean. Smithsonian Institution Press, Washington, 308 pp. <https://doi.org/10.5962/bhl.title.10375>

Kerstitch A, Bertsch H (2007) Sea of Cortez Marine Invertebrates. A Guide for the Pacific Coast, Mexico to Peru. 2<sup>nd</sup> edn. Sea Challengers, Monterey, 124 pp.

Khalaji-Pirbalouty V, Gagnon J-M (2021) A new species of *Dynoides* Barnard, 1914 (Crustacea, Isopoda, Sphaeromatidae) from Canada, with notes on geographic distribution of the north-eastern Pacific Ocean species. *Marine Biology Research* 17(1): 12–20. <https://doi.org/10.1080/17451000.2021.1892766>

Khalaji-Pirbalouty V, Wägele J-W (2010) A new species and a new record of *Sphaeroma* Bosc, 1802 (Sphaeromatidae: Isopoda: Crustacea) from intertidal marine habitats of the Persian Gulf. *Zootaxa* 2631(1): 1–18. <https://doi.org/10.11646/zootaxa.2631.1.1>

Kim SH, Yoon SM (2021) Four new species of isopods (Crustacea, Isopoda) from South Korea. *ZooKeys* 1010: 133–164. <https://doi.org/10.3897/zookeys.1010.59101>

King RA (2003) *Neastacilla* Tattersall, 1921 redefined, with eight new species from Australia (Crustacea: Isopoda: Arcturidae). *Memoirs of the Museum of Victoria* 60(2): 371–416. <https://doi.org/10.24199/j.mmv.2003.60.29>

Klapow LA (1972) Fortnightly molting and reproductive cycles in the sand-beach isopod, *Excirolana chiltoni*. *The Biological Bulletin* 143(3): 568–591. <https://doi.org/10.2307/1540184>

Kozloff EN (1974) Keys to the Marine Invertebrates of Puget Sound, the San Juan Archipelago, and Adjacent Regions. University of Washington Press, Seattle and London, 226 pp.

Kozloff EN (1983) Seashore Life of the Northern Pacific Coast. An Illustrated Guide to Northern California, Oregon, Washington, and British Columbia. University of Washington Press, Seattle and London, 370 pp.

Kozloff EN (1996) Marine Invertebrates of the Pacific Northwest. Revised and expanded edition. University of Washington Press, Seattle and London, 539 pp.

Kuris AM, Carlton JT (1977) Description of a new species, *Crangon handi*, and new genus, *Lissocrangon*, of crangonid shrimps (Crustacea: Caridea) from the California coast, with notes on adaptation in body shape and coloration. The Biological Bulletin 153(3): 540–559. <https://doi.org/10.2307/1540605>

Kussakin OG (1979) Marine and brackish-water Isopoda of cold and temperate (boreal) waters of the Northern Hemisphere. Flabellifera. National Academy of Sciences, Union of Soviet Socialist Republics, Zoology (Opredeliteli po Faune USSR, Akademiya Nauk USSR) 122: 1–470.

Kussakin OG (1982) Marine and brackish-water Isopoda of cold and temperate (boreal) waters of the Northern Hemisphere. Anthuridea, Microcerberidea, Valvifera, Tyloidea. National Academy of Sciences, Union of Soviet Socialist Republics, Zoology (Opredeliteli po Faune USSR, Akademiya Nauk USSR) 131: 1–461.

Kussakin OG (1988) Marine and brackish-water Isopoda of cold and temperate (boreal) waters of the Northern Hemisphere. Vol. III. Asellota, Part 1. National Academy of Sciences, Union of Soviet Socialist Republics, Zoology (Opredeliteli po Faune USSR, Akademiya Nauk USSR) 152: 1–500.

Kussakin OG (1999) Marine and brackish-water Isopoda of cold and temperate (boreal) waters of the Northern Hemisphere. Vol. III. Asellota, Part 2. National Academy of Sciences, Russia, Zoology (Opredeliteli po Faune, Akademiya Nauk Russia) 169: 1–383.

Kussakin OG (2003) Marine and brackish-water Isopoda of cold and temperate (boreal) waters of the Northern Hemisphere. Vol. III. Asellota, Part 3. National Academy of Sciences, Russia, Zoology (Opredeliteli po Faune, Akademiya Nauk Russia) 171: 1–380.

Lafferty KD, Suchanek TH (2016) Revisiting Paine's 1966 sea star removal experiment, the most-cited empirical article in the American Naturalist. American Naturalist 188(4): 365–378. <https://doi.org/10.1086/688045>

Latrelle PA (1817) Les Crustacés, les Arachnides et les Insectes, distribués en familles naturelles. In: Cuvier M leC (Ed.) Le Règne Animal Distribué d'Après son Organisation, pour Servir de Base a l'Histoire Naturelle des Animaux et d'Introduction a l'Anatomie Comparée Paris, Deterville 3: 1–653.

Lavesque N, Sorbe J-C, Bachelet G, Gouillieux B, de Montaudouin X, Bonifacio P, Blanchet H, Dubois S (2013) Recent discovery of *Paranthura japonica* Richardson, 1909 (Crustacea: Isopoda: Paranthuridae) in European marine waters (Arcachon Bay, Bay of Biscay). BioInvasions Records 2(3): 215–219. <https://doi.org/10.3391/bir.2013.2.3.07>

Lazarus-Agudelo JF, Cantera-Kintz JR (2007) Crustáceos (Crustacea: Sessilia, Stomatopoda, Isopoda, Amphipoda, Decapoda) de Bahía Málaga, Valle del Cauca (Pacífico colombiano). Biota Colombiana 8(2): 221–239.

Leach WE (1814) Crustaceology. In: Brewster D (Ed.) The Edinburgh Encyclopedia. Balfour, Edinburgh 7(2): 385–437, 765–766.

Lee WL, Miller MA (1980) Isopoda and Tanaidacea: the isopods and allies. In: Morris RH, Abbott DP, Haderlie EC (Eds) Intertidal Invertebrates of California, 3<sup>rd</sup> edn. Stanford University Press, Stanford, 536–558.

Leistikow A, Wägele J-W (1999) Checklist of the terrestrial isopods of the new world (Crustacea, Isopoda, Oniscidea). *Revista Brasileira de Zoologia* 16(1): 1–72. <https://doi.org/10.1590/S0101-81751999000100001>

Lendemer J, Thiers B, Monfils AK, Zaspel J, Ellwood ER, Bentley A, LeVan K, Bates J, Jennings D, Contreras D, Lagomarsino L, Mabee P, Ford LS, Guralnick R, Groppe RE, Revelez M, Cobb N, Seltmann K, Aime MC (2020) The extended specimen network: A strategy to enhance US biodiversity collections, promote research and education. *Bioscience* 70(1): 23–30. <https://doi.org/10.1093/biosci/biz140>

Li L (2000) A new species of *Dynoides* (Crustacea: Isopoda: Sphaeromatidae) from the Cape d’Aguilar Marine Reserve, Hong Kong. *Records of the Australian Museum* 52(2): 137–149. <https://doi.org/10.3853/j.0067-1975.52.2000.1311>

Lie U (1968) A quantitative study of benthic infauna in Puget Sound, Washington, USA, in 1963–1964. *Fiskeridirektoratets skrifter. Serie Havundersøkelser* 14(5): 229–556.

Lissner A, Phillips C, Cadien D, Smith R, Bernstein B, Cimberg R, Kauwling T, Anikouchine W (1986) Assessment of long-term changes in biological communities in the Santa Maria Basin and Western Santa Barbara Channel – Phase I. Vol. II, Synthesis of Findings. Prepared for: United States Department of the Interior, Minerals Management Service, Pacific OCS Region, Los Angeles, 789 pp.

Liu W, Poore GCB (2013) A new record of *Cleantiooides emarginata* Kwon & Kim, 1992 (Crustacea, Isopoda, Valvifera) from Changjiang River estuary, China. *Chinese Journal of Oceanology and Limnology* 31(3): 625–631. <https://doi.org/10.1007/s00343-013-2197-9>

Lockington WN (1877a) Remarks on the Crustacea of the Pacific Coast, with descriptions of some new species. *Proceedings of the California Academy of Sciences* 7 (for 1876): 44–46. <https://doi.org/10.5962/bhl.part.27534>

Lockington WN (1877b) Description of seventeen new species of Crustacea. *Proceedings of the California Academy of Sciences* 7 (for 1876): 41–48. <https://doi.org/10.5962/bhl.title.37841>

Looby A, Ginsburg DW (2021) Nearshore species biodiversity of a marine protected area off Santa Catalina Island, California. *Western North American Naturalist* 81(1): 113–130. <https://doi.org/10.3398/064.081.0110>

Los Angeles County Sanitation Districts [LACSD] (2020) Joint Water Pollution Control Plant Biennial Receiving Water Monitoring Report 2018–2019. LACSD, Whittier, 162 pp. <https://www.lacsd.org/home/showpublisheddocument/4432/637648109065900000>

Loyola e Silva J (1971) Sobre os gêneros *Ancinus* Milne Edwards, 1840 e *Bathycopea* Tattersall, 1909, da coleção U.S. Nat. Mus. (Isopoda-Crustacea). *Arquivos do Museu Nacional, Rio de Janeiro* 54: 209–223.

Macdonald TA, Burd BJ, Macdonald VI, van Roodselaar A (2010) Taxonomic and feeding guild classification for the marine benthic macroinvertebrates of the Strait of Georgia, British Columbia. *Canadian Technical Report of Fisheries and Aquatic Sciences* 2874: [iv +] 63 pp.

Mahmoud NE, Fahmy MM, Abuwarda MM, Khattab MS (2016) Parasitic cymothoid isopods and their impacts in commercially important fishes from Lake Qarun, Egypt. *International Journal of Chemtech Research* 9(12): 221–229.

Mak PMS, Huang ZG, Morton BS (1985) *Sphaeroma walkeri* Stebbing (Isopoda, Sphaeromatidae) introduced into and established in Hong Kong. *Crustaceana* 49(1): 75–81. <https://doi.org/10.1163/156854085X00224>

Maloney JO (1933) Two new species of isopod crustaceans from California. *Journal of the Washington Academy of Sciences* 23(3): 144–147.

Maloney E, Fairey R, Lyman A, Reynolds K, Sigala M (2006) Introduced Aquatic Species in California Open Coastal Waters. Final Report (December 2006). California Department of Fish and Game. Office of Spill Prevention and Response. Sacramento, 93 pp.

Maloney E, Fairey R, Lyman A, Walton Z, Sigala M (2008) Introduced Aquatic Species in California's Open Coastal Waters – 2007. Final Report. California Department of Fish and Game, Sacramento, 84 pp.

Marchini A, Costa AC, Ferrario J, Micael J (2018) The global invader *Paracerceis sculpta* (Isopoda: Sphaeromatidae) has extended its range to the Azores Archipelago. *Marine Biodiversity* 48(2): 1001–1007. <https://doi.org/10.1007/s12526-017-0674-7>

Markham JC (1974a) Parasitic bopyrid isopods of the amphi-American genus *Stegophryxus* Thompson with the description of a new species from California. *Bulletin of the Southern California Academy of Sciences* 73: 33–41.

Markham JC (1974b) Extension of range and new host records for the parasitic isopod *Pseudione giardi* Calman in the northeastern Pacific. *Wasmann Journal of Biology* 32(2): 195–201.

Markham JC (1975) A review of the bopyrid isopod genus *Munidion* Hansen, 1897, parasitic on galatheid crabs in the Atlantic and Pacific oceans. *Bulletin of Marine Science* 25(3): 422–441.

Markham JC (1977a) The status and systematic position of the species of the bopyrid isopod genus *Phyllodurus* Stimpson, 1857. *Proceedings of the Biological Society of Washington* 90(4): 813–818.

Markham JC (1977b) Description of new western Atlantic species of *Argeia* Dana with a proposed new subfamily for this and related genera (Crustacea, Isopoda, Bopyridae). *Zoologische Mededeelingen* 52(9): 107–123.

Markham JC (1985a) A review of the bopyrid isopods infesting caridean shrimps in the north-western Atlantic Ocean, with special reference to those collected during the Hourglass cruises in the Gulf of Mexico. *Memoirs of the Hourglass Cruises* 7(3): 1–156.

Markham JC (1985b) A new species of *Asymmetrione* (Isopoda: Bopyridae) infesting the hermit crab *Isocheles pilosus* (Holmes) in southern California. *Bulletin of the Southern California Academy of Sciences* 84: 104–108.

Markham JC (1986) Evolution and zoogeography of the Isopoda Bopyridae, parasites of Crustacea Decapoda. In: Gore RH, Heck KL (Eds) *Crustacean Issues Vol. 4. Crustacean Biogeography*. Balkema, Rotterdam, 143–164. <https://doi.org/10.1201/9781315140674-7>

Markham JC (1992) The Isopoda Bopyridae of the Eastern Pacific – missing or just hiding? *Proceedings of the San Diego Society of Natural History* 17: 1–4.

Markham JC (2001) A review of the bopyrid isopods parasitic on thalassinidean decapods. In: Brusca RC, Kensley B (Eds) *Crustacean Issues Vol. 13. Isopod Systematics and Evolution*. Balkema, Rotterdam, 195–204.

Markham JC (2002) A new species of *Leidya* Cornalia and Panceri, 1861, and the first record of the genus *Lobocepion* Nobili, 1905, both from the eastern Pacific Ocean, with a review of the parasites of grapsid crabs worldwide (Isopoda, Bopyridae, Ioninae). In: Alvarez F,

Escobar-Briones E (Eds) Modern Approaches to the Study of Crustacea. Kluwer Academic/Plenum Publishers, New York, 329–338. [https://doi.org/10.1007/978-1-4615-0761-1\\_46](https://doi.org/10.1007/978-1-4615-0761-1_46)

Markham JC (2003) A worldwide list of hermit crabs and their relatives (Anomura: Paguroidea) reported as hosts of Isopoda Bopyridae. In: Lemaitre R, Tudge CC (Eds) Biology of the Anomura. Proceedings of a symposium at the Fifth International Crustacean Congress, Melbourne, Australia, 9–13 July 2001. Memoirs of Museum Victoria 60(1): 71–77. <https://doi.org/10.24199/j.mmv.2003.60.10>

Markham JC (2004) New species and records of Bopyridae (Crustacea: Isopoda) infesting species of the genus *Upogebia* (Crustacea: Decapoda: Upogebiidae): the genera *Orthione* Markham, 1988, and *Gyge* Cornalia and Panceri, 1861. Proceedings of the Biological Society of Washington 117(2): 186–198.

Markham JC (2005) New species and records of Bopyridae (Crustacea: Isopoda) infesting species of the genus *Upogebia* (Crustacea: Decapoda: Upogebiidae): the genus *Progebiophilus* Codreanu and Codreanu, 1963; and remarks on *Phyllodurus* Stimpson, 1857. Proceedings of the Biological Society of Washington 118(1): 84–95. [https://doi.org/10.2988/0006-324X\(2005\)118\[84:NSAROB\]2.0.CO;2](https://doi.org/10.2988/0006-324X(2005)118[84:NSAROB]2.0.CO;2)

Markham JC (2008) New records of pseudionine bopyrid isopods, including two new species and one new genus, infesting porcellanid crabs (Decapoda: Anomura) on the Pacific coast of North and Central America. Bulletin of the Southern California Academy of Sciences 107(3): 145–157. <https://doi.org/10.3160/0038-3872-107.3.145>

Markham JC (2016) Redescription of *Bathygyge grandis* Hansen, 1897 (Crustacea, Isopoda, Bopyridae) from Southern California with erection of a new subfamily, Bathygiginae, for it. Bulletin of the Southern California Academy of Sciences 115(1): 72–80. <https://doi.org/10.3160/soca-115-01-72-80.1>

Markham JC (2020) Chapter 6. Isopoda Epicaridea from deep water around North and Central America. In: Hendrickx ME (Ed.) Deep-Sea Pycnogonids and Crustaceans of the Americas, Springer, 143–156. [https://doi.org/10.1007/978-3-030-58410-8\\_6](https://doi.org/10.1007/978-3-030-58410-8_6)

Martin JW, Davis GE (2001) An updated classification of the recent Crustacea. Natural History Museum of Los Angeles County Contributions in Science 39: 1–124.

Martin JW, Olesen J, Høeg JT [Eds] (2014) Atlas of crustacean larvae. John Hopkins University Press, Baltimore, 370 pp. <https://doi.org/10.1353/book.31448>

Martin MB, Bruce NL, Nowak BF (2015) Review of the fish-parasitic genus *Ceratothoa* Dana, 1852 (Crustacea: Isopoda: Cymothoidae) from Australia, with description of two new species. Zootaxa 3963(3): 251–294. <https://doi.org/10.11646/zootaxa.3963.3.1>

Martin JW, Pentcheff ND, Striley D, Perrodin C, Wall AR, Wall J, Zieba J (Eds) (2022) Crustacea Glossary. Crustacea Department, Natural History Museum of Los Angeles County. [Accessed: 06 Sep 2022] <https://research.nhm.org/glossary>

McDermott JJ, Williams JD, Boyko CB (2010) The unwanted guests of hermits: A global review of the diversity and natural history of hermit crab parasites. Journal of Experimental Marine Biology and Ecology 394(1–2): 2–44. <https://doi.org/10.1016/j.jembe.2010.06.022>

McLaughlin PA, Camp DK, Angel MV, Bousfield EL, Brunel P, Brusca RC, Cadien D, Cohen AC, Conlan K, Eldredge LG, Felder DL, Goy JW, Haney T, Hann B, Heard RW, Hendrycks EA, Hobbs III HH, Holsinger JR, Kensley B, Laubitz DR, LeCroy SE, Lemaitre R, Maddocks RF, Martin JW, Mikkelsen P, Nelson E, Newman WA, Overstreet RM, Poly WJ,

Price WW, Reid JW, Robertson A, Rogers DC, Ross A, Schotte M, Schram FR, Shih C-T, Watling L, Wilson GDF, Turgeon DD (2005) Common and Scientific Names of Aquatic Invertebrates from the United States and Canada: Crustaceans. American Fisheries Society Special Publication 31: [xiii +] 1–545 [+ CD-ROM].

Mejía-Rebollo A, Zayas-Álvarez A, Morales-Zárate V, Salinas-Zavala CA (2018) New record and contribution to the knowledge of *Neastacilla californica* (Boone, 1918) (Isopoda, Arcitidae) on the west coast of Baja California, Mexico. Latin American Journal of Aquatic Research 46(1): 230–233. <https://doi.org/10.3856/vol46-issue1-fulltext-23>

Melwani AR, Kim SL (2008) Benthic infaunal distributions in shallow hydrothermal vent sediments. Acta Oecologica 33(2): 162–175. <https://doi.org/10.1016/j.actao.2007.10.008>

Menzies RJ (1950a) The taxonomy, ecology, and distribution of northern California isopods of the genus *Idothea* with the description of a new species. Wasmann Journal of Biology 8(2): 155–195.

Menzies RJ (1950b) A remarkable new species of marine isopod, *Erichsonella crenulata* n. sp., from Newport Bay, California. Bulletin of the Southern California Academy of Sciences 49: 29–35. <https://doi.org/10.3160/0038-3872-49.1.29>

Menzies RJ (1950c) Notes on California isopods of the genus *Armadilloniscus*, with the description of *Armadilloniscus coronacapitalis* n. sp. Proceedings of the California Academy of Sciences 4<sup>th</sup> series 26(13): 467–481. <https://biostor.org/reference/78362>

Menzies RJ (1951a) A new species of *Limnoria* (Crustacea: Isopoda) from southern California. Bulletin of the Southern California Academy of Sciences 50: 86–88.

Menzies RJ (1951b) New marine isopods, chiefly from northern California, with notes on related forms. Proceedings of the United States National Museum 101(3273): 105–156. <https://doi.org/10.5479/si.00963801.101-3273.105>

Menzies RJ (1951c) A new genus and new species of asellote isopod, *Caecijaera horvathi*, from Los Angeles-Long Beach Harbor. American Museum Novitates 1542: 1–7. <http://hdl.handle.net/2246/3702>

Menzies RJ (1952) Some marine asellote isopods from northern California, with descriptions of nine new species. Proceedings of the United States National Museum 102(3293): 117–159. <https://doi.org/10.5479/si.00963801.102-3293.117>

Menzies RJ (1954) A review of the systematics and ecology of the genus “*Exosphaeroma*,” with the description of a new genus, a new species, and a new subspecies (Crustacea, Isopoda, Sphaeromatidae). American Museum Novitates 1683: 1–24. <http://hdl.handle.net/2246/4909>

Menzies RJ (1957) The marine borer family Limnoriidae (Crustacea, Isopoda). Bulletin of Marine Science of the Gulf and Caribbean 7: 101–200.

Menzies RJ (1958) The distribution of wood-boring *Limnoria* in California. Proceedings of the California Academy of Sciences 4<sup>th</sup> series 29(7): 267–272.

Menzies RJ (1962a) The marine isopod fauna of Bahia de San Quintin, Baja California, Mexico. Pacific Naturalist 3(11): 337–348.

Menzies RJ (1962b) The zoogeography, ecology, and systematics of the Chilean marine isopods. Reports of the Lund University Chile Expedition 1948–49. 42. Lunds Universitets Arsskrifter N.F. Avd. 2, 57(11): 1–162.

Menzies RJ, Barnard JL (1951) The isopodan genus *Iais* (Crustacea). Bulletin of the Southern California Academy of Sciences 50(Part 3): 136–151.

Menzies RJ, Barnard JL (1959) Marine Isopoda on coastal shelf bottoms of southern California: Systematics and ecology. *Pacific Naturalist* 1(11): 1–35.

Menzies RJ, Bowman TE (1956) Emended description and assignment to the new genus *Ronalea* of the idotheid isopod *Erichsonella pseudoculata* Boone. *Proceedings of the United States National Museum* 106(3371): 339–343. <https://doi.org/10.5479/si.00963801.106-3371.339>

Menzies RJ, Glynn PW (1968) The common marine isopod Crustacea of Puerto Rico. A handbook for marine biologists. *Studies on the fauna of Curaçao and other Caribbean Islands* 27(1): 1–133.

Menzies RJ, Miller MA (1972) Systematics and zoogeography of the genus *Synidotea* (Crustacea: Isopoda) with an account of Californian species. *Smithsonian Contributions to Zoology* 102(102): 1–33. <https://doi.org/10.5479/si.00810282.102>

Menzies RJ, Mohr JL (1952) The occurrence of the wood-boring crustacean *Limnoria* and of *Nebaliacea* in Morro Bay, California. *Wasmann Journal of Biology* 10(1): 81–86.

Menzies RJ, Pettit J (1956) A new genus and species of marine asellote isopod, *Caecianiropsis psammophila*, from California. *Proceedings of the United States National Museum* 106(3376): 441–446. <https://doi.org/10.5479/si.00963801.106-3376.441>

Menzies RJ, Waidzunas RJ (1948) Postembryonic growth changes in the isopod *Pentidotea resecata* (Stimpson) with remarks on their taxonomic significance. *The Biological Bulletin* 95(1): 107–113. <https://doi.org/10.2307/1538157>

Menzies RJ, Bowman TE, Alverson FG (1955) Studies of the biology of the fish parasite *Livoneca convexa* Richardson (Crustacea, Isopoda, Cymothoidae). *Wasmann Journal of Biology* 13(2): 277–295.

Meyer C, Duffy E, Collins A, Paulay G, Wetzer R (2021) The U.S. Ocean Barcode. *Marine Technology Society Journal* 55(3): 140–141. <https://doi.org/10.4031/MTSJ.55.3.33>

Mezhov BV (1986) Bathyal and abyssal Nannoniscidae and Desmosomatidae (Isopoda, Asellota) from Alaska Bay. *Archives of the Zoological Museum, Moscow State University* 24: 126–167. [In Russian]

Miers EJ (1881) Revision of the Idoteidae, a family of sessile-eyed Crustacea. *Zoological Journal of the Linnean Society* 16(89): 1–88. <https://doi.org/10.1111/j.1096-3642.1881.tb02274a.x>

Miller MA (1936) California isopods of the genus *Porcellio* with descriptions of a new species and a new subspecies. *University of California Publications in Zoology* 41: 165–172.

Miller MA (1968) Isopoda and Tanaidacea from buoys in coastal waters of the continental United States, Hawaii, and the Bahamas (Crustacea). *Proceedings of the United States National Museum* 125(3652): 1–53. <https://doi.org/10.5479/si.00963801.125-3652.1>

Miller MA (1975) Phylum Arthropoda: Crustacea, Tanaidacea and Isopoda. In: Smith RI, Carlton JT (Eds) *Light's Manual: Intertidal Invertebrates of the Central California Coast*. University of California Press, Berkeley, 277–312.

Miller MA, Lee WL (1970) A new idoteid isopod *Idothea (Pentidotea) kirchanskii*, from Central California (Crustacea). *Proceedings of the Biological Society of Washington* 82: 789–798.

Miller SE, Barrow LN, Ehlman SM, Goodheart JA, Greiman SE, Lutz HL, Misiewicz TM, Smith SM, Tan M, Thawley CJ, Cook JA, Light JE (2020) Building natural history collections for the twenty-first century and beyond. *Bioscience* 70(8): 674–687. <https://doi.org/10.1093/biosci/biaa069>

Milne Edwards H (1840) *Histoire Naturelle des Crustacés, Comprenant l'Anatomie, la Physiologie et la Classification de ces Animaux*. Encyclopédique Roret, Paris III: 1–638.

Moles A (2007) Parasites of the fishes of Alaska and surrounding waters. *Alaska Fishery Research Bulletin* 12(2): 197–226.

Monod T (1926) Les Gnathiidae. Essai monographique (morphologie, biologie, systematique). *Memoires de la Societe des Sciences Naturelles du Maroc* 12: 1–667.

Montagne DE, Cadien DB (2001) Northern range extensions into the Southern California Bight of ten decapod Crustacea related to the 1991/92 and 1997/98 El Niño events. *Bulletin of the Southern California Academy of Sciences* 100(3): 199–211.

Montelli L, Lewis J (2008) Survey of Biofouling on Australian Navy Ships: Crustacea; Isopoda and Amphipoda; Caprellidea. Technical Report DSTO-TR-2098, Maritime Platforms Division, DSTO Defense Science and Technology Organization, Victoria, Australia, 50 pp.

Moore W (2004) Description of a new *Synidotea* species (Crustacea: Isopoda: Valvifera: Idoteidae) from Hawaii. *Proceedings of the Biological Society of Washington* 117(1): 76–87.

Moore EC, Hovel KA (2010) Relative influence of habitat complexity and proximity to patch edges on seagrass epifaunal communities. *Oikos* 119(8): 1299–1311. <https://doi.org/10.1111/j.1600-0706.2009.17909.x>

Morales-Zarate MV, Zayas-Alvarez A, Salinas-Zavala CA, Mejia-Rebollo A (2016) Biocenosis of benthic community in Guerrero Negro Lagoon, Baja California Sur, Mexico: Spatio-temporal characterization. *Latin American Journal of Aquatic Research* 44(4): 726–742. <https://doi.org/10.3856/vol44-issue4-fulltext-8>

Müller H (1990) Hyssuridae from the Caribbean coast of Colombia, with descriptions of four new species (Isopoda: Anthuridea). *Bijdragen tot de Dierkunde* 60(2): 65–78. <https://doi.org/10.1163/26660644-06002001>

Munguia P, Shuster SM (2013) Established populations of *Paracerceis sculpta* (Isopoda) in the northern Gulf of Mexico. *Journal of Crustacean Biology* 33(1): 137–139. <https://doi.org/10.1163/1937240X-00002112>

NASEM [National Academies of Sciences, Engineering, and Medicine] (2020) *Biological Collections: Ensuring Critical Research and Education for the 21<sup>st</sup> Century*. Washington, DC: The National Academies Press, 244 pp. <https://doi.org/10.17226/25592>

Naylor E (1957) The occurrence of *Idotea metallica* Bosc in British waters. *Journal of the Marine Biological Association of the United Kingdom* 36(3): 599–602. <https://doi.org/10.1017/S002531540002587X>

Negromonte AO, Lucatelli D, Paiva RJC, Souza-Filho JF (2022) Three new species of the genus *Cleantiooides* Kensley and Kaufman, 1978 (Isopoda: Valvifera) from Brazil, with new record of the family Holognathidae from Brazil. *Journal of Natural History* 56(13–16): 923–941. <https://doi.org/10.1080/00222933.2022.2056538>

Nierstrasz HF, Brender à Brandis GA (1926) Isopoda. Epicaridea. *Die Tierwelt der Nord- und Ostsee* Teil X, Section E, Part 1: 1–56. <https://doi.org/10.1163/26660644-02401001>

Nierstrasz HF, Brender à Brandis GA (1929) Papers from Dr. Th. Mortensen's Pacific Expedition 1914–16. 48. Epicaridea 1. *Videnskabelige Meddelelser fra Dansk Naturhistorisk Forening I Kjøbenhavn* 87: 1–44.

Nobuhiro S, Kyoko K (2004) Prevalence of the bopyrid isopod *Ione cornuta* (Crustacea: Isopoda: Epicaridea) on the ghost shrimp *Nihonotrypaea japonica* (Crustacea: Decapoda:

Thalassinidea) on a tidal flat of Shinhma Lagoon, northern Tokyo Bay. *Japanese Journal of Benthology* 59: 1–7. <https://doi.org/10.5179/benthos.59.1>

O'Clair RM, O'Clair CE (1998) Southeast Alaska's Rocky Shores. Animals. Plant Press, Auke Bay, 564 pp.

Orange County Sanitation District [OCSD] (2022) Marine Monitoring Annual Report, Program Year 2020–2021. OCSD, Environmental Laboratory and Ocean Monitoring Division, Fountain Valley, 144 pp. <https://www.ocsan.gov/home/showpublisheddocument/32585/637830212490770000>

Ormsby B (1991) *Synisoma wetzerae*, a new species and the first record of *Synisoma* from the new world (Crustacea: Isopoda: Valvifera: Idoteidae). *Proceedings of the Biological Society of Washington* 104(4): 758–763.

Ortiz M, Lalana R (2018) Lista de especies y distribución de los isópodos (Crustacea: Peracarida) de Cuba. *Novitates Caribaea* (12): 102–126. <https://doi.org/10.33800/nc.v0i12.87>

Özdikem H (2009) A new name, *Smenispa* for the preoccupied isopod genus *Enispa* Schioedte & Meinert, 1884 (Isopoda: Cymothoidae). *Munis Entomology & Zoology* 4(2): 611–612.

Pearse AS (1953) Parasitic crustaceans from Alligator Harbor, Florida. *Quarterly Journal of the Florida Academy of Sciences* 15(4): 187–243.

Pérez-Schultheiss J, Urra F (2020) Isópodos terrestres (Crustacea: Isopoda: Oniscidea) del Parque Nacional Bosque Fray Jorge, Región de Coquimbo, Chile. *Boletín del Museo Nacional de Historia Natural* 69(2): 29–54. <https://doi.org/10.54830/bmhn.v69.n2.2020.4>

Pérez-Schultheiss J, Ayala K, Fariña JM, Coccia C (2018) Exotic oniscideans (Crustacea: Isopoda) in coastal salt marshes: first record of the families Halophilosciidae and Platyarthridae in continental Chile. *New Zealand Journal of Zoology* 46(3): 225–235. <https://doi.org/10.1080/03014223.2018.1539017>

Pfeffer G. (1887) Die Krebse von Süd-Georgien nach der Ausbeute der Deutschen Station 1882-83. *Jahrbuch der Hamburgischen Wissenschaftlichen Anstalten* 4: 43–150 [pls. 1–7]. <https://doi.org/10.5962/bhl.title.10084>

Pires AMS (1980) New record of Sphaeromatidae (Isopoda) from the Brazilian southern coast: *Dynamenella dianae* (Menzies, 1962). *Crustaceana* 39(2): 133–140. <https://doi.org/10.1163/156854080X00030>

Pires AMS (1984) Taxonomic revision and phylogeny of the genus *Erichsonella* with a discussion on *Ronalea* (Isopoda, Valvifera). *Journal of Natural History* 18(5): 665–683. <https://doi.org/10.1080/00222938400770571>

Pires AMS (1987) The contribution of isopods in the feeding of *Sympterygia* spp. (Pisces: Rajidae) with a description of *Ancinus gaucho* sp. n. (Isopoda: Sphaeromatidae). *Boletim do Instituto Oceanográfico, São Paulo* 35(2): 115–122. <https://doi.org/10.1590/S0373-55241987000200002>

Pires-Vanin AMS, Muniz P, Bromberg S (2014) Inventory of the marine soft bottom macrofauna of São Sebastião Channel, southeastern Brazilian continental shelf. *Check List* 10(4): 795–807. <https://doi.org/10.15560/10.4.795>

Poore GCB (1975) Australian species of *Haliophasma* (Crustacea: Isopoda: Anthuridae). *Records of the Australian Museum* 29(19): 503–533. <https://doi.org/10.3853/j.0067-1975.29.1975.211>

Poore GCB (1980) A revision of the genera of the Paranthuridae (Crustacea: Isopoda: Anthuridea) with a catalogue of species. *Zoological Journal of the Linnean Society* 68(1): 53–67. <https://doi.org/10.1111/j.1096-3642.1980.tb01918.x>

Poore GCB (1984a) *Paranthura* (Crustacea, Isopoda, Paranthuridae) from south-eastern Australia. *Memoirs of the Museum of Victoria* 45(1): 33–69. <https://doi.org/10.24199/j.mmv.1984.45.04>

Poore GCB (1984b) *Colanthura*, *Califanthura*, *Cruranthura* and *Cruregens*, related genera of the Paranthuridae (Crustacea: Isopoda). *Journal of Natural History* 18(5): 697–715. <https://doi.org/10.1080/00222938400770601>

Poore GCB (1984c) Redefinition of *Munna* and *Uromunna* (Crustacea: Isopoda: Munnidae), with descriptions of five species from coastal Victoria. *Proceedings of the Royal Society of Victoria* 96(2): 61–81.

Poore GCB (1996) Species differentiation in *Synidotea* (Isopoda: Idoteidae) and recognition of introduced marine species: a reply to Chapman and Carlton. *Journal of Crustacean Biology* 16(2): 384–394. <https://doi.org/10.2307/1548894>

Poore GCB (2001a) Families and genera of Isopoda Anthuridea. In: Kensley B, Brusca RC (Eds) *Isopod Systematics and Evolution*. Balkema: Rotterdam, Crustacean Issues 13: 63–173.

Poore GCB (2001b) Isopoda Valvifera: Diagnoses and relationships of the families. *Journal of Crustacean Biology* 21(1): 205–230. <https://doi.org/10.1163/20021975-99990118>

Poore GCB (2015) Thermoarcturidae, a new crustacean family of three genera (Isopoda: Valvifera). *Zootaxa* 4007(3): 409–418. <https://doi.org/10.11646/zootaxa.4007.3.7>

Poore GCB, Bruce NL (2012) Global diversity of marine isopods (except Asellota and crustacean symbionts). *PLoS ONE* 7(8): e43529. <https://doi.org/10.1371/journal.pone.0043529>

Poore GCB, Lew Ton HM (1986) *Mesanthura* (Crustacea: Isopoda: Anthuridae) from southeastern Australia. *Memoirs of the Museum of Victoria* 47(1): 87–104. <https://doi.org/10.24199/j.mmv.1986.47.04>

Poore GCB, Lew Ton HM (1988a) More Australian species of *Haliophasma* (Crustacea: Isopoda: Anthuridae). *Memoirs of the Museum of Victoria* 49(1): 85–106. <https://doi.org/10.24199/j.mmv.1988.49.07>

Poore GCB, Lew Ton HM (1988b) *Amakusanthura* and *Apanthura* (Crustacea: Isopoda: Anthuridae) with new species from tropical Australia. *Memoirs of the Museum of Victoria* 49(1): 107–147. <https://doi.org/10.24199/j.mmv.1988.49.08>

Poore GCB, Lew Ton HM (1988c) A generic review of the Hysuridae (Crustacea: Isopoda). *Memoirs of the Museum of Victoria* 49(1): 169–193. <https://doi.org/10.24199/j.mmv.1988.49.11>

Poore GCB, Lew Ton HM (1988d) Antheluridae, a new family of Crustacea (Isopoda: Anthuridea) with new species from Australia. *Journal of Natural History* 22(2): 489–506. <https://doi.org/10.1080/00222938800770341>

Poore GCB, Lew Ton HM (1990) The Holognathidae (Crustacea: Isopoda: Valvifera) expanded and redefined on the basis of body-plan. *Invertebrate Taxonomy* 4(1): 55–80. <https://doi.org/10.1071/IT9900055>

Poore GCB, Lew Ton HM (1993) Idoteidae of Australia and New Zealand (Crustacea: Isopoda: Valvifera). *Invertebrate Taxonomy* 7(2): 197–278. <https://doi.org/10.1071/IT9930197>

Poore GCB, Lew Ton HM (2002) Expanathuridae (Crustacea: Isopoda) from the Australian region. *Zootaxa* 82(1): 1–60. <https://doi.org/10.11646/zootaxa.82.1.1>

Puget Sound Institute (2012–2023) Encyclopedia of Puget Sound. University of Washington Tacoma Center for Urban Waters, Tacoma. <https://www.eopugetsound.org> [Accessed on 30 Jan 2023]

Rafi F, Laubitz DR (1990) The Idoteidae (Crustacea: Isopoda: Valvifera) of the shallow waters of the northeastern North Pacific Ocean. *Canadian Journal of Zoology* 68(12): 2649–2687. <https://doi.org/10.1139/z90-370>

Ramalhosa P, Nebra A, Gestoso I, Canning-Clode J (2017) First record of the non-indigenous isopods *Paracerceis sculpta* (Holmes, 1904) and *Sphaeroma walkeri* Stebbing, 1905 (Isopoda, Sphaeromatidae) for Madeira Island. *Crustaceana* 90(14): 1747–1764. <https://doi.org/10.1163/15685403-00003727>

Ranasinghe JA, Montagne DE, Smith RW, Mikel TK, Weisberg SB, Cadien D, Velarde R, Dalkey A (2003) Southern California Bight 1998 Regional Monitoring Program: VII. Benthic Macrofauna. Technical Report 382. Southern California Coastal Water Research Project, Westminster, CA, 91 pp. [+ appendices] <https://www.sccwrp.org/publications>

Ranasinghe JA, Mikel TK, Velarde RG, Weisberg SB, Montagne DE, Cadien DB, Dalkey A (2005) The prevalence of non-indigenous species in southern California embayments and their effects on benthic macroinvertebrate communities. *Biological Invasions* 7(4): 679–686. <https://doi.org/10.1007/s10530-004-5857-z>

Ranasinghe JA, Barnett AM, Schiff K, Montagne DE, Brantley C, Beegan C, Cadien DB, Cash C, Deets GB, Diener DR, Mikel TK, Smith RW, Velarde RG, Watts SD, Weisberg SB (2007) Southern California Bight 2003 Regional Monitoring Program: III. Benthic Macrofauna. Technical Report 529. Southern California Coastal Water Research Project, Costa Mesa, 44 pp. [+ appendices] <https://www.sccwrp.org/publications>

Ranasinghe JA, Schiff KC, Brantley CA, Lovell LL, Cadien DB, Mikel TK, Velarde RG, Holt S, Johnson SC (2012) Southern California Bight 2008 Regional Monitoring Program: VI. Benthic Macrofauna. Technical Report 665. Southern California Coastal Water Research Project, Costa Mesa, CA. 71 pp. [+ appendices] <https://www.sccwrp.org/publications>

Reed BJ, Hovel KA (2006) Seagrass habitat disturbance: How loss and fragmentation of eelgrass *Zostera marina* influences epifaunal abundance and diversity. *Marine Ecology Progress Series* 326: 133–143. <https://doi.org/10.3354/meps326133>

Richardson H (1898) Description of four new species of *Rocinela*, with a synopsis of the genus. *Proceedings of the American Philosophical Society* 37(157): 8–17.

Richardson H (1899) Key to the isopods of the Pacific coast of North America, with descriptions of twenty-two new species. *Proceedings of the United States National Museum* 21(1175): 815–869. <https://doi.org/10.5479/si.00963801.21-1175.815>

Richardson H (1900a) Results of the Branner-Agassiz expedition to Brazil. II. The isopod Crustacea. *Proceedings of the Washington Academy of Sciences* 2: 157–159. <https://doi.org/10.5962/bhl.part.5669>

Richardson H (1900b) Synopses of North-American invertebrates. VIII. The Isopoda. Part I. Chelifera, Flabellifera, Valvifera. *American Naturalist* 34(399): 207–230. <https://doi.org/10.1086/277593>

Richardson H (1900c) Synopses of North-American invertebrates. VIII. The Isopoda. Part II. Asellota, Oniscoidea, Epicaridea. *American Naturalist* 34(400): 295–309. <https://doi.org/10.1086/277619>

Richardson H (1904a) Contributions to the natural history of the Isopoda. Parts I–IV. Proceedings of the United States National Museum 27(1350): 1–89. <https://doi.org/10.5479/si.00963801.27-1350.113>

Richardson H (1904b) Contributions to the natural history of the Isopoda. Parts V–VI. Proceedings of the United States National Museum 27(1369): 657–681. <https://doi.org/10.5479/si.00963801.27-1369.657>

Richardson H (1905a) A monograph of the isopods of North America. Bulletin of the United States National Museum 54(54): 1–727. <https://doi.org/10.5479/si.03629236.54.i>

Richardson H (1905b) Isopods from the Alaska Salmon Investigation. Bulletin of the Bureau of Fisheries (for 1904) 24(1): 209–221.

Richardson H (1905c) Description of a new species of *Livoneca* from the Atlantic coast of Panama. Proceedings of the United States National Museum 29(1430): 445–446. <https://doi.org/10.5479/si.00963801.29-1430.445>

Richardson H (1906) Descriptions of new isopod crustaceans of the family Sphaeromidae. Proceedings of the United States National Museum 31(1479): 1–22. <https://doi.org/10.5479/si.00963801.31-1479.1>

Richardson H (1908) On some isopods of the family Dajidae from the northwest Pacific Ocean, with descriptions of a new genus and two new species. Proceedings of the United States National Museum 33(1586): 689–696. <https://doi.org/10.5479/si.00963801.33-1586.689>

Richardson H (1909) Isopods collected in the northwest Pacific by the U. S. Bureau of Fisheries Steamer “Albatross” in 1906. Proceedings of the United States National Museum 37(1701): 75–129. <https://doi.org/10.5479/si.00963801.37-1701.75>

Richardson H (1912) Descriptions of a new genus of isopod crustaceans, and of two new species from South America. Proceedings of the United States National Museum 43(1929): 201–204. <https://doi.org/10.5479/si.00963801.43-1929.201>

Ricketts EF, Calvin J (1952) Between Pacific Tides. 3<sup>rd</sup> edn., revised by JW Hedgpeth. Stanford University Press, Stanford, 502 pp.

Ricketts EF, Calvin J (1968) Between Pacific Tides. 4<sup>th</sup> edn., revised by JW Hedgpeth. Stanford University Press, Stanford, 614 pp.

Ricketts EF, Calvin J, Hedgpeth JW (1985) Between Pacific Tides. 5<sup>th</sup> edn., revised by DW Phillips. Stanford University Press, Stanford, 652 pp. <https://doi.org/10.1515/9781503621329>

Riera R (2014) Are marine drifting species cosmopolitan? The example of the isopod *Idotea metallica*. Thalassas. International Journal of Material Science 30(1): 75–78.

Rocha LA, Aleixo A, Allen G, Almeda F, Baldwin CC, Barclay MVL, Bates JM, Bauer AM, Benzon F, Berns CM, Berumen ML, Blackburn DC, Blum S, Bolaños F, Bowie RCK, Britz R, Brown RM, Cadena CD, Carpenter K, Ceríaco LM, Chakrabarty P, Chaves G, Choat JH, Clements KD, Colette BB, Collins A, Coyne J, Cracraft J, Daniel D, de Carvalho MR, de Queiroz K, Di Dario F, Drewes R, Dumbacher JP, English Jr A, Erdmann MV, Eschmeyer W, Feldman CR, Fisher BL, Fjeldså J, Fritsch PW, Fuchs J, Getahun A, Gill A, Gomon M, Gosliner T, Graves GR, Griswold CE, Guralnick R, Hartel K, Helgen KM, Ho H, Iskandar DT, Iwamoto T, Jaafar Z, James HF, Johnson D, Kavanaugh D, Knowlton N, Lacey E, Larson HK, Last P, Leis JM, Lessios H, Liebherr J, Lowman M, Mahler DL, Mamonekene V, Matsuura K, Mayer GC, Mays Jr H, McCosker J, McDiarmid RW, McGuire J, Miller MJ, Mooi R, Mooi RD, Moritz C, Myers P, Nachman MW, Nussbaum RA, Foighil DÓ, Parenti

LR, Parham JF, Paul E, Paulay G, Pérez-Emán J, Pérez-Matus A, Poe S, Pogonoski J, Rabosky DL, Randall JE, Reimer JD, Robertson DR, Rödel M-O, Rodrigues MT, Roopnarine P, Rüber L, Ryan MJ, Sheldon F, Shinohara G, Short A, Simison WB, Smith-Vaniz WF, Springer VG, Stiassny M, Tello JG, Thompson CW, Trnski T, Tucker P, Valqui T, Vecchione M, Verheyen E, Wainwright PC, Wheeler TA, White WT, Will K, Williams JT, Williams G, Wilson EO, Winker K, Winterbottom R, Witt CC (2014) Specimen collection: An essential tool. *Science* 344(6186): 814–815. <https://doi.org/10.1126/science.344.6186.814>

Rocha-Ramírez A, Chávez-López R, Peláez-Rodríguez E (2010) *Ancinus jarocho* (Isopoda: Sphaeromatidea: Ancinidae), a new species from the central Gulf of Mexico, Mexico. *Zootaxa* 2397(1): 61–68. <https://doi.org/10.11646/zootaxa.2397.1.6>

Rodríguez A, Drake P, Arias AM (1992) First records of *Paracerceis sculpta* (Holmes, 1904) and *Paradella dianae* (Menzies, 1962) (Isopoda, Sphaeromatidae) at the Atlantic coast of Europe. *Crustaceana* 63(1): 94–97. <https://doi.org/10.1163/156854092X00334>

Roletto J, Kimura S, Cosentino-Manning N, Berger R, Bradley R (2014) Status and trends of the rocky intertidal community on the Farallon Islands. *Monographs of the Western North American Naturalist* 7(1): 260–275. <https://doi.org/10.3398/042.007.0120>

Rotramel G (1972) *Iais californica* and *Sphaeroma quoyanum*, two symbiotic isopods introduced to California (Isopoda, Janiridae and Sphaeromatidae). *Crustaceana* (Supplement 3): 193–197.

Rotramel GL (1975) Observations on the commensal relations of *Iais californica* (Richardson, 1904) and *Sphaeroma quoyanum* H. Milne Edwards, 1840 (Isopoda). *Crustaceana* 28(1): 247–256. <https://doi.org/10.1163/156854075X01125>

Ruiz G, Fofonoff P, Steves B, Dahlstrom A (2011) Marine crustacean invasions in North America: a synthesis of historical records and documented impacts. In: Galil BS, Clark PF, Carlton JT (Eds) *In the Wrong Place – Alien Marine Crustaceans: Distribution, Biology and Impacts*, Springer, *Invading Nature* 6: 215–250. [https://doi.org/10.1007/978-94-007-0591-3\\_6](https://doi.org/10.1007/978-94-007-0591-3_6)

Rumbold C, Meloni M, Doti B, Correa N, Albano M, Sylvester F, Obenat S (2018) Two new nonindigenous isopods in the southwestern Atlantic: Simultaneous assessment of population status and shipping transport vector. *Journal of Sea Research* 138: 1–7. <https://doi.org/10.1016/j.seares.2018.04.008>

Salazar-Vallejo SI, Leija-Tristán A (1990) *Progebiophilus bruscai* n. sp., a new bopyrid isopod parasitic on the mud shrimp, *Upogebia dawsoni* Williams (Thalassinoidea), from the Gulf of California. *Cahiers de Biologie Marine* 30: 423–432.

Santamaria CA, Mateos M, DeWitt TJ, Hurtado LA (2016) Constrained body shape among highly genetically divergent allopatric lineages of the supralittoral isopod *Ligia occidentalis* (Oniscidea). *Ecology and Evolution* 6(5): 1537–1554. <https://doi.org/10.1002/ece3.1984>

Santos AM, Xavier R, Zenboudji S, Branco T, Branco M (2011) *Stenosoma stephensi* sp. n. (Isopoda, Idoteidae), from the southwestern Mediterranean, with a note on the nomenclatural status of *Synisoma* Collinge, 1917. *ZooKeys* 141: 29–44. <https://doi.org/10.3897/zookeys.141.1376>

Sassaman C, Schultz GA, Garthwaite R (1984) Host, synonymy, and parasitic incidence of *Bopyrella calmani* (Richardson) from central California (Isopoda: Epicaridea: Bopyridae). *Proceedings of the Biological Society of Washington* 97(3): 645–654.

SCAMIT (1994) A taxonomic listing of soft bottom macroinvertebrates from infaunal monitoring programs in the Southern California Bight, 1<sup>st</sup> edn. Southern California Association of Marine Invertebrate Taxonomists, San Pedro, 72 pp. <https://www.scamit.org/publications>

SCAMIT (1996) A taxonomic listing of soft bottom macro- and megainvertebrates from infaunal and epibenthic monitoring programs in the Southern California Bight, 2<sup>nd</sup> edn. Southern California Association of Marine Invertebrate Taxonomists, San Pedro, 86 pp. <https://www.scamit.org/publications>

SCAMIT (1998) A taxonomic listing of soft bottom macro- and megainvertebrates from infaunal and epibenthic monitoring programs in the Southern California Bight, 3<sup>rd</sup> edn. Southern California Association of Marine Invertebrate Taxonomists, San Pedro, 167 pp. <https://www.scamit.org/publications>

SCAMIT (2001) A taxonomic listing of soft bottom macro- and megainvertebrates from infaunal and epibenthic monitoring programs in the Southern California Bight, 4<sup>th</sup> edn. Southern California Association of Marine Invertebrate Taxonomists, San Pedro, 192 pp. <https://www.scamit.org/publications>

SCAMIT (2008) A taxonomic listing of benthic macro- and megainvertebrates from infaunal and epifaunal monitoring and research programs in the Southern California Bight, 5<sup>th</sup> edn. Cadien DB, Lovell LL (Eds) Southern California Association of Marine Invertebrate Taxonomists, Los Angeles, 210 pp. <https://www.scamit.org/publications>

SCAMIT (2011) A taxonomic listing of benthic macro- and megainvertebrates from infaunal and epifaunal monitoring and research programs in the Southern California Bight, 6<sup>th</sup> edn. Cadien DB, Lovell LL (Eds) Southern California Association of Marine Invertebrate Taxonomists, Los Angeles, 211 pp. <https://www.scamit.org/publications>

SCAMIT (2012) A taxonomic listing of benthic macro- and megainvertebrates from infaunal and epifaunal monitoring and research programs in the Southern California Bight, 7<sup>th</sup> edn. Cadien DB, Lovell LL (Eds) Southern California Association of Marine Invertebrate Taxonomists, Los Angeles, 137 pp. <https://www.scamit.org/publications>

SCAMIT (2013) A taxonomic listing of benthic macro- and megainvertebrates from infaunal and epifaunal monitoring and research programs in the Southern California Bight, 8<sup>th</sup> edn. Cadien DB, Lovell LL (Eds) Southern California Association of Marine Invertebrate Taxonomists, Los Angeles, 143 pp. <https://www.scamit.org/publications>

SCAMIT (2014) A taxonomic listing of benthic macro- and megainvertebrates from infaunal and epifaunal monitoring and research programs in the Southern California Bight, 9<sup>th</sup> edn. Cadien DB, Lovell LL (Eds) Southern California Association of Marine Invertebrate Taxonomists, Los Angeles, 166 pp. <https://www.scamit.org/publications>

SCAMIT (2015) A taxonomic listing of benthic macro- and megainvertebrates from infaunal and epifaunal monitoring and research programs in the Southern California Bight, 10<sup>th</sup> edn. Cadien DB, Lovell LL (Eds) Southern California Association of Marine Invertebrate Taxonomists, Los Angeles, 171 pp. <https://www.scamit.org/publications>

SCAMIT (2016) A taxonomic listing of benthic macro- and megainvertebrates from infaunal and epifaunal monitoring and research programs in the Southern California Bight, 11<sup>th</sup> edn. Cadien DB, Lovell LL (Eds) Southern California Association of Marine Invertebrate Taxonomists, Los Angeles, 171 pp. <https://www.scamit.org/publications>

SCAMIT (2018) A taxonomic listing of benthic macro- and megainvertebrates from infaunal and epifaunal monitoring and research programs in the Southern California Bight, 12<sup>th</sup>

edn. Cadien DB, Lovell LL, Barwick KL (Eds) Southern California Association of Marine Invertebrate Taxonomists, Los Angeles, 167 pp. <https://www.scamit.org/publications>

SCAMIT (2021) A taxonomic listing of benthic macro- and megainvertebrates from infaunal and epifaunal monitoring and research programs in the Southern California Bight, 13<sup>th</sup> edn. Cadien DB, Lovell LL, Barwick KL, Haggin BM (Eds) Southern California Association of Marine Invertebrate Taxonomists, Los Angeles, 203 pp. <https://www.scamit.org/publications>

Schiff K, Weisberg S, Raco-Rands V (2002) Inventory of ocean monitoring in the Southern California Bight. *Environmental Management* 29(6): 871–876. <https://doi.org/10.1007/s00267-001-2628-9>

Schiff K, Greenstein D, Dodder N, Gillett DJ (2016) Southern California Bight regional monitoring. *Regional Studies in Marine Science* 4: 34–46. <https://doi.org/10.1016/j.rsma.2015.09.003>

Schiff K, McLaughlin K, Moore S, Cao Y (2019) Chapter 19 – Southern California Bight. In: Sheppard C (Ed.) *World Seas: An Environmental Evaluation* (2<sup>nd</sup> edn.), Academic Press, 465–482. <https://doi.org/10.1016/B978-0-12-805068-2.00023-1>

Schioedte JC, Meinert FW (1879) *Symbolae ad Monographiam Cymothoarum Crustaceorum Isopodum Familiae 1. Aegidae*. *Naturhistorisk Tidsskrift* 3(12): 321–414. <https://doi.org/10.5962/bhl.title.10300>

Schioedte JC, Meinert FW (1881) *Symbolae ad Monographiam Cymothoarum Crustaceorum Isopodum Familiae 2. Anilocridae*. *Naturhistorisk Tidsskrift* 3(13): 1–166.

Schioedte JC, Meinert FW (1884) *Symbolae ad Monographiam Cymothoarum Isopodum Familiae 4. Cymothoidae. Trib. II. Cymothoinae. Trib. III. Livonecinae*. *Naturhistorisk Tidsskrift* 3(14): 221–454.

Schmalfuss H (2003) World catalog of terrestrial isopods (Isopoda: Oniscidea). *Stuttgarter Beiträge zur Naturkunde, Serie A, Biologie* 654: 1–341.

Schmidt C (2008) Phylogeny of the terrestrial Isopoda (Oniscidea): A review. *Arthropod Systematics & Phylogeny* 66(2): 191–226.

Schmidt C, Leistikow A (2004) Catalogue of genera of the terrestrial Isopoda (Crustacea: Isopoda: Oniscidea). *Steenstrupia* (Copenhagen) 28(1): 1–118.

Schotte M (2005) *Discerces kensleyi*, n. sp., from Caribbean Columbia, the third species of the genus (Crustacea: Isopoda: Sphaeromatidae). *Proceedings of the Biological Society of Washington* 118(1): 48–54. [https://doi.org/10.2988/0006-324X\(2005\)118\[48:DKNSFC\]2.0.CO;2](https://doi.org/10.2988/0006-324X(2005)118[48:DKNSFC]2.0.CO;2)

Schultz GA (1964) Some marine isopod crustaceans from off the southern California coast. *Pacific Science* 18(3): 307–314. <http://hdl.handle.net/10125/5557>

Schultz GA (1966) Marine isopods of the submarine canyons of the southern California continental shelf. *Allan Hancock Pacific Expeditions* 27(4): 1–56.

Schultz GA (1969) How to Know the Marine Isopod Crustaceans. Wm. C. Brown Company Publishers, Dubuque, 359 pp.

Schultz GA (1970) A review of the species of the genus *Tylos* Latreille from the New World (Isopoda, Oniscoidea). *Crustaceana* 19(3): 297–305. <https://doi.org/10.1163/156854070X00383>

Schultz GA (1972) *Gnathia sanctaerudivis* nom. nov., substituted for the preoccupied name *Gnathia hirsuta* Schultz, 1966, from southern California (Isopoda, Gnathiidae). *Crustaceana* 23(1): 112. <https://doi.org/10.1163/156854072X00110>

Schultz GA (1973) *Ancinus* H. Milne Edwards in the New World (Isopoda, Flabellifera). *Crustaceana* 25(3): 267–275. <https://doi.org/10.1163/156854073X00254>

Schultz GA (1977) Anthurids from the west coast of North America, including a new species and three new genera (Crustacea, Isopoda). *Proceedings of the Biological Society of Washington* 90: 839–848.

Schultz GA (1984) Four species of *Alloniscus* Dana, 1854, from the west coast of North America and Hawaii (Isopoda, Oniscoidea). *Crustaceana* 47(2): 149–167. <https://doi.org/10.1163/156854084X00388>

Sept DJ (2002) *The Beachcomber's Guide to Seashore Life of California*. Harbour Publishing, Madeira Park, 312 pp.

Sept DJ (2019) *The New Beachcomber's Guide to the Pacific Northwest*. Harbour Publishing, Madeira Park, 416 pp.

Serov PA, Wilson GDF (1995) A review of the Stenetriidae (Crustacea: Isopoda: Asellota). *Records of the Australian Museum* 47(1): 39–82. <https://doi.org/10.3853/j.0067-1975.47.1995.2>

Sfenthourakis S, Taiti S (2015) Patterns of taxonomic diversity among terrestrial isopods. In: Taiti S, Hornung E, Štrus J, Bouchon D (Eds) *Trends in Terrestrial Isopod Biology*. *ZooKeys* 515: 13–25. <https://doi.org/10.3897/zookeys.515.9332>

Shaughnessy F, Mulligan T, Kramer S, Kullmann S, Largier J (2017) Baseline Characterization of Biodiversity and Target Species in Estuaries along the North Coast of California. Final Report (September 2017), 112 pp. <https://doi.org/10.13140/RG.2.2.30944.94724>

Shearer GM (1942) A study of marine isopods of the Coos Bay region. Master of Science Thesis, Oregon State College. Corvallis, 64 pp.

Sheppard EM (1933) Isopod Crustacea. Part I. The family Serolidae. *Discovery Reports* 7: 253–362.

Sheppard EM (1957) Isopod Crustacea. Part II. The suborder Valvifera. Families: Idoteidae, Pseudidotheidae and Xenarcturidae fam. n. with a supplement to isopod Crustacea, Part I. The family Serolidae. *Discovery Reports* 29: 141–198. <https://doi.org/10.5962/bhl.part.12485>

Shiino SM (1934) Bopyrids from Tanabe Bay II. *Memoirs of the College of Science, Kyoto University, Series B* 9 (4, Article 7): 257–287.

Shiino SM (1964) On three bopyrid isopods from California. *Report of the Faculty of Fisheries. Perfectural University of Mie* 5: 19–25.

Shimomura M (2008) *Bathycopae* (Isopoda: Sphaeromatidea: Ancinidae) from Japan, with descriptions of two new species and redescription of *B. parallela* Birstein. *Zootaxa* 1678(1): 25–49. <https://doi.org/10.11646/zootaxa.1678.1.2>

Shimomura M, Mawatari SF (2001) Munnidae from Japan (Crustacea: Isopoda: Asellota). *Publications of the Seto Marine Biological Laboratory* 39(2/3): 45–73. <https://doi.org/10.5134/176302>

Shuster SM (1987) Alternative reproductive behaviors: Three discrete male morphs in *Paracerceis sculpta*, an intertidal isopod from the northern Gulf of California. *Journal of Crustacean Biology* 7(2): 318–327. <https://doi.org/10.2307/1548612>

Shuster SM (1992) The reproductive behaviour of  $\alpha$ -,  $\beta$ -, and  $\gamma$ -male morphs in *Paracerceis sculpta*, a marine isopod crustacean. *Behaviour* 121(3–4): 231–257. <https://doi.org/10.1163/156853992X00381>

Shuster SM, Guthrie EE (1999) Effects of temperature and food availability on adult body length in natural and laboratory populations of *Paracerceis sculpta* (Holmes), a Gulf of California isopod. *Journal of Experimental Marine Biology and Ecology* 233(2): 269–284. [https://doi.org/10.1016/S0022-0981\(98\)00133-6](https://doi.org/10.1016/S0022-0981(98)00133-6)

Shuster SM, Wade MJ (1991a) Equal mating success among male reproductive strategies in a marine isopod. *Nature* 350(6319): 608–610. <https://doi.org/10.1038/350608a0>

Shuster SM, Wade MJ (1991b) Female copying and sexual selection in a marine isopod crustacean, *Paracerceis sculpta*. *Animal Behaviour* 41(6): 1071–1078. [https://doi.org/10.1016/S0003-3472\(05\)80645-1](https://doi.org/10.1016/S0003-3472(05)80645-1)

Siebenaller JF, Hessler RR (1981) The genera of the Nanniscidae (Isopoda, Asellota). *Transactions of the San Diego Society of Natural History* 19(16): 227–250.

Silva CG, Gomes EL, Figueiredo NC, Silva GB (2019) First record of the biodiversity of isopods in *Katsuwonus pelamis* from South America (NE Brazil). *Journal of Dairy, Veterinary & Animal Research* 8(2): 102–105.

Sirota L, Hovel KA (2006) Simulated eelgrass *Zostera marina* structural complexity: Effects of shoot length, shoot density, and surface area on the epifaunal community of San Diego Bay, California, USA. *Marine Ecology Progress Series* 326: 115–131. <https://doi.org/10.3354/meps326115>

Smit NJ, Davies AJ (2004) The curious life-style of the parasitic stages of gnathiid isopods. *Advances in Parasitology* 58: 289–391. [https://doi.org/10.1016/S0065-308X\(04\)58005-3](https://doi.org/10.1016/S0065-308X(04)58005-3)

Smit NJ, Bruce NL, Hadfield KA (2014) Global diversity of fish parasitic isopod crustaceans of the family Cymothoidae. *International Journal for Parasitology. Parasites and Wildlife* 3(2): 188–197. <https://doi.org/10.1016/j.ijppaw.2014.03.004>

Smit NJ, Bruce NL, Hadfield KA [Eds] (2019) Parasitic Crustacea. State of Knowledge and Future Trends. *Zoological Monographs* 3. Springer, Cham, 481 pp. <https://doi.org/10.1007/978-3-030-17385-2>

Smith CR, Baco AR (2003) Ecology of whale falls at the deep-sea floor. *Oceanography and Marine Biology - an Annual Review* 41: 311–354.

Smith RW, Bergen M, Weisberg SB, Cadien D, Dalkey A, Montagne D, Stull JK, Velarde RG (2001) Benthic response index for assessing infaunal communities on the mainland shelf of southern California. *Ecological Applications* 11(4): 1073–1087. [https://doi.org/10.1890/1051-0761\(2001\)011\[1073:BRIFAI\]2.0.CO;2](https://doi.org/10.1890/1051-0761(2001)011[1073:BRIFAI]2.0.CO;2)

Smith RW, Ranasinghe JA, Weisberg SB, Montagne DE, Cadien DB, Mikel TK, Velarde RG, Dalkey A (2003) Extending the southern California Benthic Response Index to assess benthic condition in bays. *Technical Report* 410. Southern California Coastal Water Research Project. Westminster, 36 pp. [+ 4 appendices] <https://www.sccwrp.org/publications>

Stafford BE (1913a) Studies in Laguna Beach Isopoda II. *Journal of Entomology and Zoology* 5(3): 161–172.

Stafford BE (1913b) Studies in Laguna Beach Isopoda IIB. *Journal of Entomology and Zoology* 5(4): 182–188.

Stebbing TRR (1900) On some crustaceans from the Falkland Islands, collected by Mr. Rupert Vallentin. *Proceedings of the Zoological Society of London* 1900: 517–568. <https://doi.org/10.5962/bhl.title.10309>

Stebbing TRR (1905) Report on the Isopoda collected by Professor Herdman, at Ceylon, in 1902. In: Herdman WA. *Report to the Government of Ceylon on the Pearl Oyster Fisheries of the Gulf of Manaar, Supplemental Report* 23: 1–64.

Stebbins TD (1988a) Observations and experiments on the natural history and behavior of the commensal isopod *Colidotea rostrata* (Benedict, 1898) (Isopoda: Idoteidae). *Journal of Crustacean Biology* 8(4): 539–547. <https://doi.org/10.2307/1548690>

Stebbins TD (1988b) The role of sea urchins in mediating fish predation on a commensal isopod (Crustacea: Isopoda). *Journal of Experimental Marine Biology and Ecology* 124(2): 97–113. [https://doi.org/10.1016/0022-0981\(88\)90114-1](https://doi.org/10.1016/0022-0981(88)90114-1)

Stebbins TD (1989) Population dynamics and reproductive biology of the commensal isopod *Colidotea rostrata* (Crustacea: Isopoda: Idoteidae). *Marine Biology* 101(3): 329–337. <https://doi.org/10.1007/BF00428129>

Stebbins TD (2012a) Key and notes to California valviferan isopods (Crustacea, Isopoda, Valvifera). <https://www.scamit.org/tools>

Stebbins TD (2012b) California “Epicaridean” Isopods Superfamilies Bopyroidea and Cryptoniscoidea (Crustacea, Isopoda, Cymothoida). Presentation to Southern California Association of Marine Invertebrate Taxonomists, 13 February 2012. <https://www.scamit.org/tools>

Stebbins TD (2012c) California valviferan isopods (Crustacea, Isopoda, Valvifera). Presentation to Southern California Association of Marine Invertebrate Taxonomists, 13 February 2012. <https://www.scamit.org/tools>

Stepien CA, Brusca RC (1985) Nocturnal attacks on nearshore fishes in southern California by crustacean zooplankton. *Marine Ecology Progress Series* 25: 91–105. <https://doi.org/10.3354/meps025091>

Stimpson W (1857) The Crustacea and Echinodermata of the Pacific shores of North America. *Boston Journal of Natural History* 6: 503–513. <https://doi.org/10.5962/bhl.title.59693>

Stimpson W (1864) Descriptions of new species of marine invertebrates from Puget Sound. *Proceedings of the Philadelphia Academy of Sciences* 16: 153–161.

Stuxberg A (1875) Om Nord-Amerika’s oniscider. *Ofversigt Kongliga Svenska Vetenskaps-Akademien Handlingar* 32(2): 43–63.

Taiti S, Ferrara F (1986) Taxonomic revision of the genus *Littorophiloscia* Hatch, 1947 (Crustacea, Isopoda, Oniscidea) with description of six new species. *Journal of Natural History* 20(6): 1347–1380. <https://doi.org/10.1080/00222938600770911>

Taiti S, Ferrara F (1989) New species and records of *Armadilloniscus* Uljanin 1875 (Crustacea Isopoda Oniscidea) from the coasts of the Indian and Pacific oceans. *Tropical Zoology* 2(1): 59–88. <https://doi.org/10.1080/03946975.1989.10539427>

Talley TS, Crooks JA, Levin LA (2001) Habitat utilization and alteration by the invasive burrowing isopod, *Sphaeroma quoyanum*, in California salt marshes. *Marine Biology* 138(3): 561–573. <https://doi.org/10.1007/s002270000472>

Tanaka K (2007) Life history of gnathiid isopods—current knowledge and future directions. *Plankton & Benthos Research* 2(1): 1–11. <https://doi.org/10.3800/pbr.2.1>

Thistle D (1979) A redescription of two species of *Ilyarachna* (Asellota: Janiroidea) from off California (Crustacea: Isopoda). *Zoological Journal of the Linnean Society* 67(4): 381–386. <https://doi.org/10.1111/j.1096-3642.1979.tb01120.x>

Thompson B, Tsukada D, O'Donohue D (1993) Final Report 1990 Reference Site Survey. Technical Report 269. Southern California Coastal Water Research Project, Westminster, CA. 105 pp. <https://www.sccwrp.org/publications>

Toft J, Cordell J (2006) Olympic Sculpture Park: Results from Pre-construction Biological Monitoring of Shoreline Habitats. Technical Report SAFS-UW-0601, School of Aquatic and Fishery Sciences, University of Washington. Prepared for Seattle Public Utilities, City of Seattle. 36 pp.

Toft J, Cordell J, Heerhartz S, Armbrust E, Ogston A, Flemer E (2008) Olympic Sculpture Park: Results from Year 1 Post-construction Monitoring of Shoreline Habitats. Technical Report SAFS-UW-0801, School of Aquatic and Fishery Sciences, University of Washington. Prepared for Seattle Public Utilities, Seattle, 113 pp.

Toft J, Ogston A, Heerhartz S, Cordell J, Armbrust E, Levy C (2010) Olympic Sculpture Park: Year 3 Monitoring of Shoreline Enhancements. Technical Report SAFS-UW-1002, School of Aquatic and Fishery Sciences, University of Washington. Prepared for Seattle Public Utilities, Seattle, 110 pp.

Trask T (1971) *Ancinus seticomvus*, n. sp. (Isopoda), from Santa Barbara, California. *Bulletin of the Southern California Academy of Sciences* 69(3–4): 145–149.

van der Wal S, Smit NJ, Hadfield KA (2019) Review of the fish parasitic genus *Elthusa* Schioedte & Meinert, 1884 (Crustacea, Isopoda, Cymothoidae) from South Africa, including the description of three new species. *ZooKeys* 841: 1–37. <https://doi.org/10.3897/zookeys.841.32364>

Van Name WG (1936) The American land and fresh-water isopod Crustacea. *Bulletin of the American Museum of Natural History* 71: 1–535.

Van Name WG (1940) A supplement to the American land and fresh-water isopod Crustacea. *Bulletin of the American Museum of Natural History* 77: 109–142.

Van Name WG (1942) A second supplement to the American land and fresh-water isopod Crustacea. *Bulletin of the American Museum of Natural History* 80: 299–329.

Vargas-Zamora AJ, Dean HK, Mauer D, Orellana P (1985) Lista preliminar de invertebrados asociados a los sedimentos del Golfo de Nicoya, Costa Rica. *Brenesia* 24: 327–343.

Wägele J-W (1979) Morphologische Studien an *Eisothistos* mit Beschreibung von drei neuen Arten (Crustacea, Isopoda, Anthuridea). *Mitteilungen aus dem Zoologischen Museum der Universitaet Kiel* 1(2): 1–19.

Wägele J-W (1984a) Studies on Antarctic Crustacea Isopoda. 1. Anthuridea from the Weddell Sea. *Polar Biology* 3: 99–117. <https://doi.org/10.1007/BF00258154>

Wägele J-W (1984b) Two new littoral Anthuridea from Baja California and redescription of *Mesanthura occidentalis* (Crustacea, Isopoda). *Zoologica Scripta* 13(1): 45–57. <https://doi.org/10.1111/j.1463-6409.1984.tb00022.x>

Wägele J-W (1991) Antarctic Isopoda Valvifera. Keys and notes for the identification of the species. In: Wägele J-W, Sieg J (Eds) *Synopses of the Antarctic Benthos*, Vol. 2. Koeltz Scientific Books, Koenigstein, 213 pp.

Wägele J-W (1994) Notes on Antarctic and South American Serolidae (Crustacea, Isopoda) with remarks on the phylogenetic biogeography and a description of new genera. *Zoologische Jahrbücher. Abteilung für Systematik, Ökologie und Geographie der Tiere* 121(1): 3–69.

Walker AO (1898) Crustacea collected by W.A. Herdman, F.R.S., in Puget Sound, Pacific coast of North America, September 1897. *Transactions of the Liverpool Biological Society* 12: 268–287.

Wall A, Bruce NL, Wetzer R (2015) Status of *Exosphaeroma amplicauda* (Stimpson, 1857), *E. aphrodita* (Boone, 1923) and description of three new species (Crustacea, Isopoda, Sphaeromatidae) from the north-eastern Pacific. *ZooKeys* 504: 11–58. <https://doi.org/10.3897/zookeys.504.8049>

Walther SM, Williams JP, Latker AK, Cadien DB, Diehl DW, Wisenbaker K, Miller E, Gartman R, Stransky C, Schiff K (2017) Southern California Bight 2013 Regional Monitoring Program: Vol. VII. Demersal Fishes and Megabenthic Invertebrates. Technical Report 972. Southern California Coastal Water Research Project, Costa Mesa, 58 pp [+ appendices] <https://www.sccwrp.org/publications>

Wetzer R (2015) Collecting and preserving marine and freshwater Isopoda (Crustacea: Peracarida). *Biodiversity Data Journal* 3: e4912. <https://doi.org/10.3897/BDJ.3.e4912>

Wetzer R, Bruce NL (2007) A new species of *Paradella* Harrison & Holdich, 1982 (Crustacea: Isopoda: Sphaeromatidae) from Baja California, Mexico, with a key to East Pacific species. *Zootaxa* 1512(1): 39–49. <https://doi.org/10.11646/zootaxa.1512.1.2>

Wetzer R, Brusca RC (1997) Descriptions of the species of the suborders Anthuridea, Epicaridea, Flabellifera, Gnathiidea, and Valvifera. In: Blake JA, Scott PH (Eds) *Taxonomic Atlas of the Benthic Fauna of the Santa Maria Basin and Western Santa Barbara Channel, Vol. 11: The Crustacea Part 2: The Isopoda, Cumacea and Tanaidacea*, 9–58.

Wetzer R, Mowery G (2017) Redescription of *Dynoides elegans* (Boone, 1923) (Crustacea, Isopoda, Sphaeromatidae) from the north-eastern Pacific. *ZooKeys* 646: 1–16. <https://doi.org/10.3897/zookeys.646.10626>

Wetzer R, Kuck HG, Baéz R, Brusca RC, Jurkevics LM (1991) Catalog of the isopod Crustacea type collection of the Natural History Museum of Los Angeles County. Technical Reports No. 3, Natural History Museum of Los Angeles County, Los Angeles, 59 pp.

Wetzer R, Brusca RC, Wilson GDF (1997) Introduction to the marine Isopoda. In: Blake JA, Scott PH (Eds) *Taxonomic Atlas of the Benthic Fauna of the Santa Maria Basin and Western Santa Barbara Channel, Vol. 11: The Crustacea Part 2: The Isopoda, Cumacea and Tanaidacea*, 1–8.

Wetzer R, Pérez-Losada M, Bruce NL (2013) Phylogenetic relationships of the family Sphaeromatidae Latreille, 1825 (Crustacea: Peracarida: Isopoda) within Sphaeromatidea based on 18S-rDNA molecular data. *Zootaxa* 3599(2): 161–177. <https://doi.org/10.11646/zootaxa.3599.2.3>

Wetzer R, Bruce NL, Pérez-Losada M (2018) Relationships of the Sphaeromatidae genera (Peracarida: Isopoda) based on 18SrDNA and 16SrDNA genes. *Arthropod Systematics & Phylogeny* 76: 1–30. <http://hdl.handle.net/10394/26937>

Wetzer R, Wall A, Bruce NL (2021) Redescription of *Gnorimosphaeroma oregonense* (Dana, 1853) (Crustacea, Isopoda, Sphaeromatidae), designation of neotype, and 16s-rDNA

molecular phylogeny of the north-eastern Pacific species. *ZooKeys* 1037: 23–56. <https://doi.org/10.3897/zookeys.1037.63017>

Whalen MA, Millard-Martin BR, Cox KD, Lemay MA, Paulay G (2020) Poleward range expansion of invasive bopyrid isopod, *Orthione griffenis* Markham, 2004, confirmed by establishment in Central British Columbia, Canada. *BioInvasions Records* 9(3): 538–548. <https://doi.org/10.3391/bir.2020.9.3.09>

Whitcraft CR, Levin LA, Talley D, Crooks JA (2008) Utilization of invasive tamarisk by salt marsh consumers. *Oecologia* 158(2): 259–272. <https://doi.org/10.1007/s00442-008-1144-5>

Whitmore RC, Brusca RC, de la Luz JLL, González-Zamorano P, Mendoza-Salgado R, Amador-Silva ES, Holguin G, Galvan-Magana F, Hastings PA, Cartron JE, Felger RS, Seminoff JA, McIvor CC (2005) The ecological importance of mangroves in Baja California Sur: conservation implications for an endangered ecosystem. Chapter 15 In: Cartron JE, Ceballos G, Felger RS (Eds) *Biodiversity, Ecosystems, and Conservation in Northern Mexico*. Oxford Press, New York, 298–333.

Williams JD, An J (2009) The cryptogenic parasitic isopod *Orthione griffenis* Markham, 2004 from the eastern and western Pacific. *Integrative and Comparative Biology* 49(2): 114–126. <https://doi.org/10.1093/icb/icp021>

Williams JD, Boyko CB (2012) The global diversity of parasitic isopods associated with crustacean hosts (Isopoda: Bopyroidea and Cryptoniscoidea). *PLoS ONE* 7(4): e35350. <https://doi.org/10.1371/journal.pone.0035350>

Williams JD, Boyko CB (2021) Out on a limb: novel morphology and position on appendages of two genera and three new species of ectoparasitic isopods (Epicaridea: Dajidae) infesting isopod and decapod hosts. *Zoosystema* 43(4): 79–100. <https://doi.org/10.5252/zoosystema2021v43a4>

Williams Jr EH, Bunkley-Williams L (2003) New records of fish-parasitic isopods (Cymothoidae) in the Eastern Pacific (Galápagos and Costa Rica). *Noticias de Galápagos* 62: 21–23. <http://hdl.handle.net/1834/25255>

Williams Jr EH, Williams LB (1980) Four new species of *Renocila* (Isopoda: Cymothoidae), the first reported from the New World. *Proceedings of the Biological Society of Washington* 93(3): 573–592.

Williams LB, Williams Jr EH (1987) Three new species of *Renocila* (Crustacea: Isopoda: Cymothoidae), external parasites of coral reef fishes from the Ryukyu Islands of Japan. *Proceedings of the Biological Society of Washington* 100(3): 417–432.

Williams JD, Boyko CB, Madad AZ (2019) Branchial parasitic isopods (Crustacea: Isopoda: Bopyridae: Pseudioninae) of hermit crabs (Crustacea: Decapoda: Diogenidae) from the western Pacific, with descriptions of a new genus and three new species. *The Raffles Bulletin of Zoology* 67: 83–118. <https://doi.org/10.1080/00222937600770451>

Wilson GD (1976) The systematics and evolution of *Haplomunna* and its relatives (Isopoda, Haplomunnidae, New family). *Journal of Natural History* 10(5): 569–580. <https://doi.org/10.1080/00222937600770451>

Wilson GD (1980) New insights into the colonization of the deep sea: Systematics and zoogeography of the Munnidae and the Pleurogoniidae comb. nov. (Isopoda; Janiroidea). *Journal of Natural History* 14(2): 215–236. <https://doi.org/10.1080/00222938000770201>

Wilson GDF (1987) The road to the Janiroidea: Comparative morphology and evolution of the assellote isopod crustaceans. *Journal of Zoological Systematics and Evolutionary Research* 25(4): 257–280. <https://doi.org/10.1111/j.1439-0469.1987.tb00608.x>

Wilson GDF (1994) A phylogenetic analysis of the isopod family Janiridae (Crustacea). *Invertebrate Taxonomy* 8(3): 749–766. <https://doi.org/10.1071/IT9940749>

Wilson GDF (1997) The suborder Asellota. In: Blake JA, Scott PH (Eds) *Taxonomic Atlas of the Benthic Fauna of the Santa Maria Basin and Western Santa Barbara Channel, Vol. 11: The Crustacea Part 2: The Isopoda, Cumacea and Tanaidacea*, 59–120.

Wilson GDF (2008a) Global diversity of isopod crustaceans (Crustacea; Isopoda) in freshwater. *Hydrobiologia* 595(1): 231–240. <https://doi.org/10.1007/s10750-007-9019-z>

Wilson GDF (2008b) A review of taxonomic concepts in the Nannoniscidae (Isopoda, Asellota), with a key to the genera and a description of *Nannoniscus oblongus* Sars. *Zootaxa* 1680(1): 1–24. <https://doi.org/10.11646/zootaxa.1680.1.1>

Wilson GD, Hessler RR (1980) Taxonomic characters in the morphology of the genus *Eurycope* (Isopoda, Asellota) with a redescription of *Eurycope cornuta* GO Sars, 1864. *Cahiers de Biologie Marine* 21(3): 241–263.

Wilson GD, Hessler RR (1981) A revision of the genus *Eurycope* (Isopoda, Asellota) with descriptions of three new genera. *Journal of Crustacean Biology* 1(3): 401–423. <https://doi.org/10.2307/1547972>

Wilson GDF, Wägele J-W (1994) Review of the family Janiridae (Crustacea: Isopoda: Asellota). *Invertebrate Taxonomy* 8(3): 683–747. <https://doi.org/10.1071/IT9940683>

Wilson GDF, Sims CA, Grutter AS (2011) Toward a taxonomy of the Gnathiidae (Isopoda) using juveniles. The external anatomy of *Gnathia aureamaculosa* zuphea stages using scanning electron microscopy. *Journal of Crustacean Biology* 31(3): 509–522. <https://doi.org/10.1651/10-3432.1>

Wisenbaker K, McLaughlin K, Diehl D, Latker A, Stolzenbach K, Gartman R, Schiff K (2021) Southern California Bight 2018 Regional Monitoring Program: Vol. IV. Demersal Fishes and Megabenthic Invertebrates. Technical Report 1183. Southern California Coastal Water Research Project. Costa Mesa, 213 pp. <https://www.sccwrp.org/publications>

Wolff T (1962) The systematics and biology of bathyal and abyssal Isopoda Asellota. *Galathea Report* 6: 1–320.

Wright JC, Harris ZC (2020) Aerial and aquatic respiration in littoral Oniscidea (Isopoda) from Southern California, USA. *Journal of Crustacean Biology* 40(4): 462–470. <https://doi.org/10.1093/jcbiol/ruaa023>

Xavier R, Santos AM, Harris DJ, Sezgin M, Machado M, Branco M (2012) Phylogenetic analysis of the north-east Atlantic and Mediterranean species of the genus *Stenosoma* (Isopoda, Valvifera, Idoteidae). *Zoologica Scripta* 41(4): 386–399. <https://doi.org/10.1111/j.1463-6409.2012.00537.x>

Zúñiga Delgado JG, Torres Conde EG, Hinostroza Miranda JD (2021) Systematic list of marine isopods of Peru, first record of *Isocladus bahamondei* Carvacho, 1997 (Crustacea, Peracarida) and contributions of its ecology for the Peruvian coast. *Revista de Investigaciones Marinas* 41(2): 22–35. <http://hdl.handle.net/1834/41821>

## Appendix I

**Table A1.** Systematic treatment and geographic distribution summary for Southern California Bight marine isopods (Crustacea: Isopoda). See annotated species list for details of geographic ranges. Distribution codes: BCN = Baja California Norte; BCS = Baja California Sur; CA = California; MX = Mexico; SCB = Southern California Bight; WW = worldwide (i.e., species also reported from regions beyond Eastern Pacific).

TAXON	Eastern Pacific Distribution
<b>Suborder Cymothoidea</b>	
Superfamily Anthuroidea	
Family Antheluridae	
<i>Ananthura luna</i> (Schultz, 1966)	SCB
Family Anthuridae	
<i>Amakusanthura californiensis</i> (Schultz, 1964)	SCB – Isla Guadalupe, BCN
<i>Cyathura munda</i> Menzies, 1951	Northern CA – Gulf of CA
<i>Haliophasma geminatum</i> Menzies & Barnard, 1959	British Columbia – San Quintin Bay, BCN
<i>Mesanthura occidentalis</i> Menzies & Barnard, 1959	SCB – Costa Rica
Family Expanathuridae	
<i>Eisothistos</i> sp. A	SCB
Family Hyssuridae	
<i>Kupellenura</i> sp. A	~ 35 km north of SCB
Family Paranthuridae	
<i>Califanthura squamosissima</i> (Menzies, 1951)	Northern CA – Oaxaca, MX
<i>Colanthura bruscai</i> Poore, 1984	SCB – Costa Rica
<i>Paranthura elegans</i> Menzies, 1951	Northern CA – Costa Rica
<i>Paranthura japonica</i> Richardson, 1909	Northern CA – SCB (+ WW)
Superfamily Cymothooidea	
Family Aegidae	
<i>Aega leontii</i> (Dana, 1854)	Central CA – SCB
<i>Aegiochus plebeia</i> (Hansen, 1897)	Aleutian Islands – Peru (+ West Pacific)
<i>Rocinela angustata</i> Richardson, 1904	Bering Sea – Gulf of CA
<i>Rocinela belliceps</i> (Stimpson, 1864)	Alaska – Gulf of CA
<i>Rocinela laticauda</i> Hansen, 1897	Central CA – Acapulco, MX
<i>Rocinela murilloi</i> Brusca & Iverson, 1985	Central CA – Chile
<i>Rocinela signata</i> Schioedte & Meinert, 1879	Northern CA – Ecuador + Galapagos (+ WW)
Family Cirolanidae	
<i>Cirolana diminuta</i> Menzies, 1962	SCB – Gulf of CA + Galapagos
<i>Cirolana harfordi</i> (Lockington, 1877)	British Columbia – Magdalena Bay, BCS
<i>Eurydice caudata</i> Richardson, 1899	SCB – Ecuador + Galapagos
<i>Excirolana chiltoni</i> (Richardson, 1905)	British Columbia – SCB (+ WW)
<i>Excirolana linguifrons</i> (Richardson, 1899)	Oregon – SCB
<i>Metacirolana joanneae</i> (Schultz, 1966)	British Columbia – SCB
<i>Natatolana californiensis</i> (Schultz, 1966)	SCB – Peru-Chile Trench
Family Corallanidae	
<i>Excorallana tricornis occidentalis</i> Richardson, 1905	SCB – Panama
<i>Excorallana truncata</i> (Richardson, 1899)	SCB – Galapagos
Family Cymothoidae	
<i>Ceratothoa gaudichaudii</i> (H. Milne Edwards, 1840)	SCB – Cape Horn (+ SW Atlantic)
<i>Ceratothoa gilberti</i> (Richardson, 1904)	SCB – Mazatlán, MX
<i>Elthusa californica</i> (Schioedte & Meinert, 1884)	Alaska – Peru
<i>Elthusa menziesi</i> (Brusca, 1981)	Coronado Islands, BCN – Gulf of CA
<i>Elthusa vulgaris</i> (Stimpson, 1857)	Oregon – Columbia
<i>Mothocyia rosea</i> Bruce, 1986	SCB – Nicaragua
<i>Nerocila acuminata</i> Schioedte & Meinert, 1881	SCB – Peru

Taxon	Eastern Pacific Distribution
<i>Renocila thresherorum</i> Williams & Bunkley-Williams, 1980	SCB – Gulf of CA (+ Egypt)
<i>Smenispa convexa</i> (Richardson, 1905)	SCB
Family Gnathiidae	
<i>Caecognathia crenulatifrons</i> (Monod, 1926)	British Columbia – BCN
<i>Caecognathia sanctaecrucis</i> (Schultz, 1972)	British Columbia – BCN
<i>Caecognathia</i> sp. A	SCB
<i>Caecognathia</i> sp. SD1	SCB
<i>Gnathia clementensis</i> Schultz, 1966	SCB
<i>Gnathia coronadoensis</i> Schultz, 1966	SCB
<i>Gnathia productatridens</i> Menzies & Barnard, 1959	SCB
<i>Gnathia steveni</i> Menzies, 1962	British Columbia – SCB
<i>Gnathia tridens</i> Menzies & Barnard, 1959	British Columbia – SCB
<i>Gnathia trilobata</i> Schultz, 1966	British Columbia – SCB
<i>Gnathia</i> sp. MBC1	SCB
Family Tridentellidae	
<i>Tridentella glutacantha</i> Delaney & Brusca, 1985	Central CA – SCB
<i>Tridentella quinicornis</i> Delaney & Brusca, 1985	SCB
Infraorder Epicaridea	
Superfamily Bopyroidea	
Family Bopyridae	
<i>Anathelges hyphalus</i> (Markham, 1974)	Central CA – SCB
<i>Aporobopyrus muguensis</i> Shiino, 1964	Northern CA – Central Baja CA
<i>Aporobopyrus oviformis</i> Shiino, 1934	SCB (+ Japan)
<i>Argeia pugettensis</i> Dana, 1853	Bering Sea – SCB (+ Japan, Korea)
<i>Asymmetrione ambodistorta</i> Markham, 1985	SCB
<i>Bathygyge grandis</i> Hansen, 1897	SCB – MX (+ WW)
<i>Bopyrella calmani</i> (Richardson, 1905)	Central CA – SCB
<i>Capitetragnonia</i> sp. A	SCB
<i>Eremitione giardi</i> (Calman, 1898)	Bering Sea – SCB
<i>Leidya infelix</i> Markham, 2002	SCB – San Quintin Bay, BCN
<i>Munidion pleuroncodis</i> Markham, 1975	Central CA – Central MX
<i>Orthione griffenis</i> Markham, 2004	British Columbia – SCB (+ Asia)
<i>Phyllodurus abdominalis</i> Stimpson, 1857	British Columbia – BCN
<i>Progebiophilus bruscai</i> Salazar-Vallejo & Leija-Tristán, 1990	SCB – Nicaragua
<i>Pseudione galacanthae</i> Hansen, 1897	British Columbia – Gulf of CA
<i>Schizobopyrina striata</i> (Nierstrasz & Brender à Brandis, 1929)	SCB – Gulf of CA
Family Ionidae	
<i>Ione cornuta</i> Spence Bate, 1863	British Columbia – Gulf of CA (+ Asia)
Superfamily Cryptoniscoidea	
Family Dajidae	
<i>Holophryxus alaskensis</i> Richardson, 1905	Alaska – SCB
<i>Zonophryxus</i> sp.	SCB
Family Hemioniscidae	
<i>Hemioniscus balani</i> Buchholz, 1866	British Columbia – MX (+ WW)
Suborder Limnoriidea	
Superfamily Limnorioidea	
Family Limnoriidae	
<i>Limnoria algarum</i> Menzies, 1957	British Columbia – SCB
<i>Limnoria quadripunctata</i> Holthuis, 1949	Northern CA – SCB (+ WW)
<i>Limnoria tripunctata</i> Menzies, 1951	Washington – Mazatlán, MX (+ WW)
Suborder Sphaeromatidea	
Superfamily Seroloidea	
Family Serolidae	
<i>Heteroserolis carinata</i> (Lockington, 1877)	SCB – San Quintin Bay, BCN, + Gulf of CA

Taxon	Eastern Pacific Distribution
Superfamily Sphaeromatoidea	
Family Ancinidae	
<i>Ancinus granulatus</i> Holmes & Gay, 1909	SCB – Gulf of CA
<i>Ancinus seticomvus</i> Trask, 1971	SCB – Mazatlán, MX
<i>Bathycopea daltonae</i> (Menzies & Barnard, 1959)	Washington – SCB
Family Sphaeromatidae	
<i>Discerceis granulosa</i> (Richardson, 1899)	SCB – Isla Cedros, BCN
<i>Dynamenella dilatata</i> (Richardson, 1899) †	Washington – SCB
<i>Dynamenella glabra</i> (Richardson, 1899) †	Oregon – SCB
<i>Dynamenella sheareri</i> (Hatch, 1947)	Washington – SCB
<i>Dynoides elegans</i> (Boone, 1923)	SCB – Isla Cedros, BCN
<i>Exosphaeroma amplicauda</i> (Stimpson, 1857) ‡	Northern CA
<i>Exosphaeroma aphrodita</i> Boone, 1923	SCB
<i>Exosphaeroma inornata</i> Dow, 1958	Washington – SCB
<i>Exosphaeroma pentcheffi</i> Wall, Bruce & Wetzer, 2015	SCB
<i>Exosphaeroma rhomburum</i> (Richardson, 1899)	Washington – SCB
<i>Gnorimosphaeroma noblei</i> Menzies, 1954	Northern CA – SCB
<i>Gnorimosphaeroma oregonense</i> (Dana, 1853) ‡	British Columbia – Central CA
<i>Paracerceis cordata</i> (Richardson, 1899)	Aleutian Islands – SCB
<i>Paracerceis gilliana</i> (Richardson, 1899)	Northern CA – SCB
<i>Paracerceis sculpta</i> (Holmes, 1904)	Central CA – Gulf of CA (+ WW)
<i>Paracerceis</i> sp. A	SCB + Gulf of CA
<i>Paradella dianae</i> (Menzies, 1962)	SCB – Gulf of CA (+ WW)
<i>Pseudosphaeroma</i> sp.	Northern CA – SCB (+ WW)
<i>Sphaeroma quoianum</i> H. Milne Edwards, 1840	Northern CA – SCB (+ WW)
<i>Sphaeroma walkeri</i> Stebbing, 1905	SCB (+ WW)
Family Tecticipitidae	
<i>Tecticeps convexus</i> Richardson, 1899	Washington – SCB
Suborder Valvifera	
Family Arcturidae	
<i>Idarcturus allelomorphus</i> Menzies & Barnard, 1959	Central CA – SCB
<i>Idarcturus hedgpethi</i> Menzies, 1951	British Columbia – SCB
<i>Idarcturus</i> sp. A	SCB
<i>Neastacilla californica</i> (Boone, 1918)	SCB – Gulf of CA
Family Holognathidae	
<i>Cleantiooides occidentalis</i> (Richardson, 1899)	SCB – Gulf of CA, Ecuador + Galapagos
Family Idoteidae	
<i>Colidotea findleyi</i> Brusca & Wallerstein, 1977	SCB – Guadalupe Isla, BCN + Gulf of CA
<i>Colidotea rostrata</i> (Benedict, 1898)	Oregon – SCB
<i>Colidotea wallersteini</i> Brusca, 1983	SCB – Guadalupe Isla, BCN
<i>Edotia sublittoralis</i> Menzies & Barnard, 1959	British Columbia – Gulf of CA + Costa Rica
<i>Edotia</i> sp. B	SCB
<i>Erichsonella crenulata</i> Menzies, 1950	SCB – San Quintin Bay, BCN
<i>Eusymmerus pseudoculata</i> (Boone, 1923)	SCB
<i>Idotea fewkesi</i> Richardson, 1905	Alaska – BCS
<i>Idotea metallica</i> Bosc, 1801	WW (pelagic), including SCB
<i>Idotea rufescens</i> Fee, 1927	Alaska – Baja CA
<i>Idotea urotoma</i> Stimpson, 1864	Alaska – Gulf of CA
<i>Pentidotea aculeata</i> Stafford, 1913	British Columbia – Gulf of CA
<i>Pentidotea kirchanskii</i> (Miller & Lee, 1970)	Oregon – SCB
<i>Pentidotea montereensis</i> Maloney, 1933	Alaska – Baja CA
<i>Pentidotea resecata</i> (Stimpson, 1857)	Alaska – Gulf of CA
<i>Pentidotea schmitti</i> (Menzies, 1950)	Bering Sea – SCB
<i>Pentidotea stenops</i> (Benedict, 1898)	Alaska – Gulf of CA

Taxon	Eastern Pacific Distribution
<i>Pentidotea wosnesenskii</i> (Brandt, 1851)	Aleutian Islands – Gulf of CA
<i>Stenosoma wetzerae</i> (Ormsby, 1991)	SCB – Gulf of CA
<i>Synidotea calcarea</i> Schultz, 1966	SCB
<i>Synidotea harfordi</i> Benedict, 1897	Oregon – Costa Rica (+ Japan)
<i>Synidotea magnifica</i> Menzies & Barnard, 1959	Central CA – SCB
<i>Synidotea media</i> Iverson, 1972	British Columbia – SCB
Family Thermoarcturidae	
<i>Califarcturus tannerensis</i> (Schultz, 1966)	SCB
<b>Suborder Asellota</b>	
Superfamily Janiroidea	
Family Dendrotrionidae	
<i>Acanthomunna tannerensis</i> Schultz, 1966	SCB
Family Desmosomatidae	
<i>Desmosoma</i> sp. A	~ 89 km north of SCB
<i>Momedossa symmetrica</i> (Schultz, 1966)	Northern CA – SCB
<i>Prochelator</i> sp. A	Northern CA to ~ 35 km north of SCB
Family Haplomunnidae	
<i>Haplomunna caeca</i> (Richardson, 1905)	SCB
Family Janiridae	
<i>Caecianiropsis</i> sp. LA1	SCB
<i>Caecianiropsis</i> sp. LA2	SCB
<i>Caecijaera horvathi</i> Menzies, 1951	SCB (+ Hawaii)
<i>Iais californica</i> (Richardson, 1904)	Northern CA – SCB (+ WW)
<i>Ianiropsis analoga</i> Menzies, 1952	Washington – SCB
<i>Ianiropsis derjugini</i> Gurjanova, 1933	Bering Sea – SCB (+ Korea)
<i>Ianiropsis kincaidi</i> Richardson, 1904	Bering Sea – SCB
<i>Ianiropsis minuta</i> Menzies, 1952	Northern CA – SCB
<i>Ianiropsis montereyensis</i> Menzies, 1952	Northern CA – SCB
<i>Ianiropsis tridens</i> Menzies, 1952	British Columbia – Chile (+ Korea)
<i>Janiralata davisi</i> Menzies, 1951	Central CA – SCB
<i>Janiralata occidentalis</i> (Walker, 1898)	British Columbia – SCB
<i>Janiralata rajata</i> Menzies, 1951	Central CA – SCB
<i>Janiralata solasteri</i> (Hatch, 1947)	Alaska – SCB
<i>Janiralata</i> sp. A	SCB
<i>Janiralata</i> sp. B	SCB
<i>Janiralata</i> sp. C	~ 35 km north of SCB
<i>Janiralata</i> sp. D	~ 35 km north of SCB
Family Joeropsididae	
<i>Joeropsis concava</i> Schultz, 1966	Central CA – SCB
<i>Joeropsis dubia dubia</i> Menzies, 1951	British Columbia – Gulf of CA
<i>Joeropsis dubia paucispinis</i> Menzies, 1951	Northern CA – SCB
<i>Joeropsis lobata</i> Richardson, 1899	Oregon to SCB
<i>Joeropsis</i> sp. A	~ 30 km north of SCB
Family Lepidocharontidae	
<i>Microcharon</i> sp. A	SCB
Family Munnidae	
<i>Munna chromatocephala</i> Menzies, 1952	British Columbia – SCB
<i>Munna fernaldi</i> George & Strömberg, 1968	Washington – SCB
<i>Munna halei</i> Menzies, 1952	Northern CA – SCB
<i>Munna magnifica</i> Schultz, 1964	SCB
<i>Munna spinifrons</i> Menzies & Barnard, 1959	SCB
<i>Munna stephensi</i> Gurjanova, 1933	Bering Sea – SCB (+ Japan)
<i>Munna</i> sp. A	SCB
<i>Uromunna ubiquita</i> (Menzies, 1952)	British Columbia – Gulf of CA

Taxon	Eastern Pacific Distribution
Family Munnopsidae	
<i>Belonectes</i> sp. A	SCB
<i>Eurycope californiensis</i> Schultz, 1966	SCB
<i>Ilyarachna acarina</i> Menzies & Barnard, 1959	Northern CA – SCB
<i>Ilyarachna profunda</i> Schultz, 1966	Northern CA – SCB
<i>Munnopsurus</i> sp. A	SCB
<i>Munnopsurus</i> sp. B	SCB
Family Nannoniscidae	
<i>Nannonisconus latipleonus</i> Schultz, 1966	SCB
Family Paramunnidae	
<i>Austrosignum latum</i> Just & Wilson, 2021	SCB
<i>Boreosignum</i> sp. A	SCB
<i>Munnogonium erratum</i> (Schultz, 1964)	Central CA – SCB
<i>Munnogonium tillerae</i> (Menzies & Barnard, 1959)	SCB
<i>Paramunna quadratifrons</i> Iverson & Wilson, 1981	SCB
<i>Paramunna</i> sp. A	SCB
<i>Paramunna</i> sp. SD1	SCB
<i>Pleurogonium californiense</i> Menzies, 1951	British Columbia – SCB
<i>Pleurogonium</i> sp. A	SCB
Family Pleurocopidae	
<i>Pleurocope</i> sp. A	Central CA – SCB
Superfamily Stenetroioidea	
Family Stenetriidae	
<i>Stenetrium</i> sp. A	~ 35 km north of SCB
<b>Suborder Oniscidea</b>	
Superfamily Oniscoidea	
Family Alloniscidae	
<i>Alloniscus mirabilis</i> (Stuxberg, 1875)	Northern CA – Magdalena Bay, BCS
<i>Alloniscus perconvexus</i> Dana, 1854	British Columbia – Magdalena Bay, BCS
Family Detonidae	
<i>Armadilloniscus coronacapitalis</i> Menzies, 1950	Northern CA – SCB
<i>Armadilloniscus holmesi</i> Arcangeli, 1933	British Columbia – Magdalena Bay, BCS
<i>Armadilloniscus lindahli</i> (Richardson, 1905)	Northern CA – SCB
Family Halophilosciidae	
<i>Littorophiloscia richardsonae</i> (Holmes & Gay, 1909)	British Columbia – Isla Cedros, BCS
Family Ligiidae	
<i>Ligia</i> cf. <i>occidentalis</i> (Dana, 1853)	SCB – BCS
Family Platyarthridae	
<i>Niambia capensis</i> (Dollfus, 1895)	Washington – Chile (+ WW)
Family Tylidae	
<i>Tylos punctatus</i> Holmes & Gay, 1909	SCB – Gulf of CA

† Taxon inquirendum (genus uncertain for *Dynamenella dilatata* and *D. glabra*).

‡ No longer considered a SCB species (see Wall et al. 2015 for *E. amplicauda*, and Wetzer et al. 2021 for *G. oregonense*).